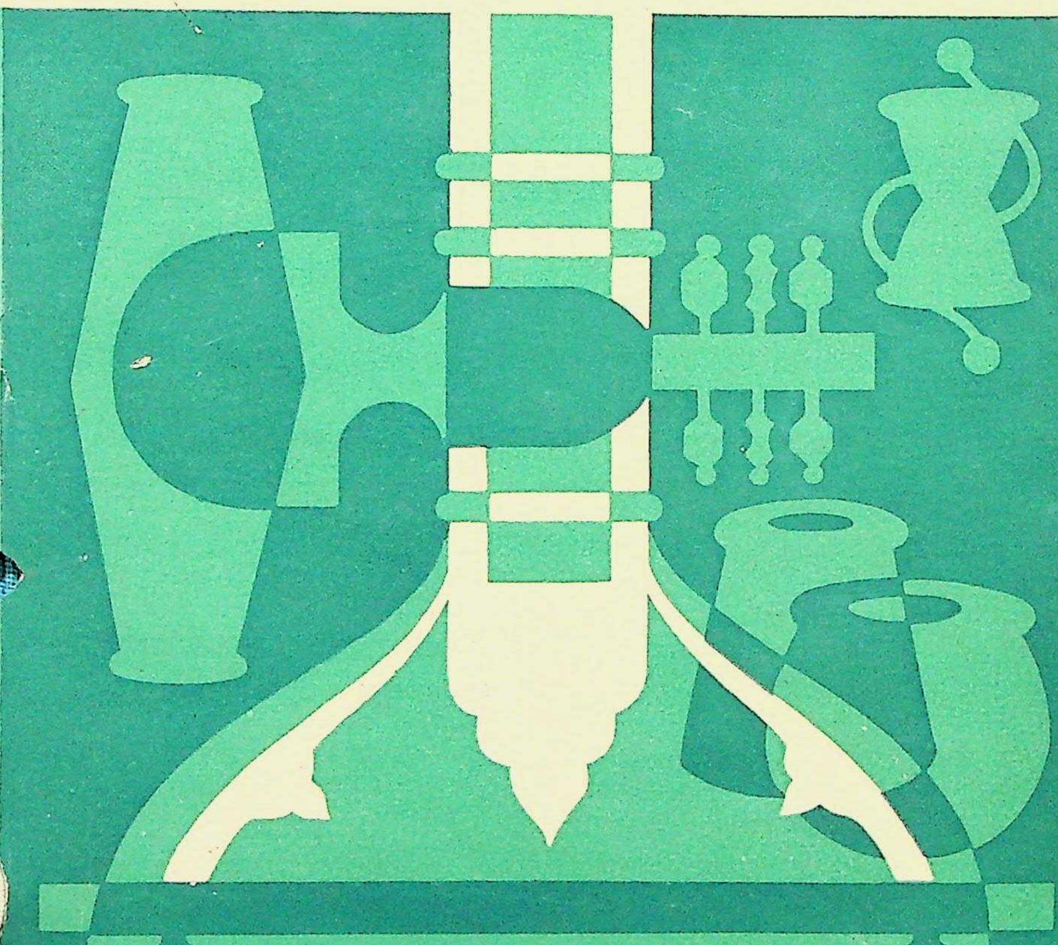
MUSICAL INSTRUMENTS OF INDIA

B. CHAITANYA DEVA



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MUSICAL INSTRUMENTS OF INDIA

THEIR HISTORY AND DEVELOPMENT

B. Chaitanya Deva

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To
the memory of
Bharata
and
Curt Sachs

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PREFACE

The present book is the result of nearly a decade of research into Indian organology—from about 1963 to 1973. The investigation covered the study of the classics, literature in many languages, visits to musea, archaeological sites and field work in various provinces, as well as meeting with folk music parties coming to Delhi. All this was financed by the State Board for Literature and Culture, Government of Maharashtra, Bombay. My very deep gratitude is due to them for this generosity as well as for publishing a book in Marathi. They have been magnanimous in loaning the blocks, without cost, for the present publication. Such encouragement is extremely rare—even from those who have the means and opportunity—and I am therefore more than beholden to them for this aid.

My thanks are due to :

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The Sangeet Natak Akademi, New Delhi for the photographs in 6.6, 8.18, 8.36.

My family have been very very patient and helpful in this work and I would like to record my thanks to them.

I must not fail to express my gratitude to Sri K. L. Mukhopadhyay for publishing this difficult work against many odds.

I have dedicated this book to the memories of sage Bharata and Curt Sachs, neither of whom I have met. But like Dronacharya to Ekalavya in the *Mahabharata*, these two have been my *Guru*-s *in Absentia*. For it was they who taught me how to marshall data and showed me the path to critical thinking.

New Delhi, 1978

B. C. Deva

FOREWORD

Dr. B. C. Deva is quite right when he says : "Surprisingly enough, in spite of so much work, no systematic study of musical instruments has been produced. Some books of limited scope, stray chapters and scattered papers are all that we come across." But an "attempt has been made to bring together material available from different sources and an effort has been made to collect information from music texts, literature, sculpture and painting from as many corners of India as possible and also by personal survey", and we are very glad to admit that this attempt and effort have honestly been made by an erudite scholar like Dr. B. C. Deva of Delhi.

Dr. B. C. Deva has shown that in studying the history of instruments, one of the most baffling aspects is nomenclature. "Often a whole class of instruments have one name, as for instance, *maddalam* or its variants. It may refer either to the *madal* of Central India, or the concert *mridangam* of South India. The *mridanga* itself connotes the Southern concert drum, the Northern *pakhavaj* or even the *khole* of Bengal and Assam. Instances can, of course, be multiplied. There is the conspicuous case of the *bheri* : a drum or trumpet in India, but a gong in Indonesia "

The musical instruments, possessed by individual nations or tribes, said Sir S. M. Tagore in his, *A Short Notices of Hindu Musical Instruments*, are generally found to be of a peculiar and fantastic shape and name or nomenclature. They are frequently constructed in the form of certain animals. "Thus a kind of harmonica of the Chinese represents the figure of crouching tiger. The Burmese possess a stringed instrument shaped like an alligator. Even more grotesque are the imitations of various beasts, adopted by the Javanese. The natives of Guinea possess a drum of singular structure, terminating in the head of a reptile. A wooden rattle, shaped like a bird, is a favourite instrument of the Indians of Nootka Sound. In short, not only in the inward construction of the instruments and their peculiar quality of sound, but also in their outward appearance, certain distinctive characteristics are discernible...There is indeed a remarkable variety in construction, form and size, of the different kinds of drums, found in almost every part of the world."

Some wind instruments of a rude kind attract our eyes. These, generally made of reed or wood, appear at first to be without finger-holes and are only capable of producing one or two notes or tones. The *sankha* of the Hindus, the alp-horn of the Swiss, and the lure of the Scandinavians are instances of this class. At this stage of musical progress are found some instruments made of the horn or tusk of an animal, as the *sringa* of the Hindus, and the large ivory trumpets of the Negroes of Western Africa, which latter are simply the hollowed tusks of elephants. In the next phase in the progress of instrumental inventions, we meet with instruments consisting of a series of pieces beaten with a stick or a hammer. This class of instruments is chiefly met with in China, Japan, Java, Siam, and Burma, and also in some aboriginal tribes. The bow was used in the chase of the wild animals and also in wars, but from the imitation of the bow, some stringed instruments like *dhanuryantram* were made or invented, and from the *dhanuryantram* or bow instrument, the violin was invented. And so the primitive bowshaped instruments may be considered as the great ancestor of the *veena* species and others constructed on a similar principle, such as the harp, *kin*, lyre and the like, and it is interesting to note that most of the stringed instruments are played with a bow, and they are found in India, China, Japan and other Asiatic and European nations. However, all such questions and investigations about the musical instruments have been taken into consideration by many writers like Curt Sachs, J. Kunst, Karl Geiringer and others.

Dr. B. C. Deva has also dealt with these facts and matters while he efficiently discusses and classifies the musical instruments of India in this neat and well-written book, *Musical Ins-*

truments of India. We are, therefore, glad for the great task he has done. His extensive study and profound scolarship have helped him to write the book with a proper historic as well as a scientific perspective.

Now, before going into detail about the texts and interpretations of the book, *Musical Instruments of India*, to be considered the prize publication undertaken by the renowned publishers, Firma KLM Private Limited of Calcutta, it will be my duty to say something about the learned author of the book.

The full name of the author, Dr. B. C. Deva, is Dr. Bigamdre Chaitanya Deva, born in Bangalore (South India). He is presently working as the Special Officer for Music in the Sangeet Natak Akademi, New Delhi, which he joined after 'a storm-tossed career of study and research'. He was a member of the faculty of music of the Delhi and other Universities and a visiting lecturer in music in various Indian Universities and has travelled abroad on musicological assignments. Before joining the present assignment in 1962, Dr. B. Chaitanya Deva worked as head of the Department of Applied Physics and Chemistry at Sir Cusrow Wadia Institute of Technology, Poona. He also conducted research in the psycho-acoustics of music for more than a decade, singly as well as in collaboration with another scholar, Prof. C. R. Sankaran, of the Deccan College, Poona. The Akhil Bharatiya Gandharva Mahavidyalaya Mandal of Bombay had conferred on him a Doctorate for his pioneering work on the *tambura*. He further got his Doctorate Degree in Physics from the University of Poona, for a dissertion on the *Psychophysics of Speech Melody in Dravidian Language* which was recently published in book form. For the study of sound in all its aspects is the function of acoustics, Dr. Deva investigated the relations between the expression of emotion in speech and speech-melody. His valuable work also indicates the way for study of the *ragas* and the emotional states associated with them. Besides, on the problem of microtones, Dr. Deva applied mathematical techniques to arrive at the conclusion that a *sruti* should be treated as both a cardinal and ordinal number and that it is both equal and unequal.

Dr. Deva spent about a year at Santiniketan and learnt Rabindra-Sangeet. He further took training in classical Indian music under great singers like Pandits Vinayak Rao Patvardhan, Keshav Bua Ingale and Ustad Aman Ali Khan and others. He was also initiated in spiritual training in *maha-yoga* by the revered Prabhakar Tembe of Sholapur and Vamanrao Gulavani of Pune.

So we find in him both scholastic and spiritual characters and tendencies that have made his attempt fruitful, and we are confident that his present work, *Musical Instruments of India*, will be recognised as an honest attempt at the collection of comprehensive data about Indian musical instruments — "classify them, relate them to the general ethnic movement in the country and present a critical history". Besides, we believe that this book of intelligent enquiry will be taken as an "invitation for further research" work on the subject, which Dr. Deva has so splendidly done.

Dr. B. Chaitanya Deva has discussed the 'Cultural Basis' and the 'Ethnic and Cultural History of Instruments'. His treatment of 'Definition and Evolution' has given a scientific direction and rational solution of the problems of "primordial Vibration", together with "nomenclature and visual representation" as well as systematic classification of instruments. His chronological method of classsification of the musical instrument is akin to the great masters of the past like Bharata and Sarngadeva. He has presented his scientific method of divisions of the musical instruments on pages 37 to 45 efficiently and the subsequent chapters have also covered all the detailed discussions on *ghana-vadya, avanaddna-vadya, sushira-vadya* and *tata-vadya*. In fact, these main four divisions were scientifically made in the 300 B.C.—200 A.D., when Bharata wrote his monumental *samgraha-grantha*, the *Natyasastra* or 'the Science of Dramaturgy', after Adi or Vriddha-Bharata who appeared, it is said, in the 600-500 B.C. So the classification, made by

Dr. B. Chaitanya Deva in his book, is known as 'the oldest Indian classification'.

Material on the musical instruments of India are available in different Sanskrit texts, general literature and history, folklore as well as in different epigraphical records, sculptures, reliefs and paintings which are executed in the rock-walls, railings and facades of different Hindu, Buddhist and Jain rock-temples and caves, and Dr. B. Chaitanya Deva has used all these sources in his book.

Now let me offer my thanks to Dr. B. Chaitanya Deva for presenting us a very learned as well as a well-arranged record on the history of musical instruments and we believe that this well-written book will be appreciated by all scholars and lovers of music in India as well as in distant countries.

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19B, Raja Rajkrishna Street,
Calcutta-700 006
10. 1. 1978

Swami Prajnanananda

CHAPTER I

INTRODUCTION

Since the commencement of the pioneering studies in Indology in the late eighteenth century there has been a sustained interest in our musicology. Great amount of research has been carried out in this area of knowledge. The number of manuscripts discovered, edited and published have brought into focus the various landmarks in Indian music history and the even greater necessity for linking them into a cogent flow.

This task—though wellnigh Herculean—has been progressing. But the antiquity of this culture, almost beyond the pale of racial memory, the vast extent of the land and the varied ethnic strains have made the piecing together of the jigsaw extremely difficult. This is made worse by most musicologists limiting themselves to textual sources. Rarely has there been an attempt to go to the foundations of culture—the people.

Surprisingly enough, in spite of so much work, no systematic study of musical instruments has been produced. Some books of limited scope, stray chapters and scattered papers are all that we come across. An attempt has therefore been made to bring together material available from different sources and present in a comprehensive organological view, the area covering tribal, folk and concert instruments. An effort has been made to collect information from music texts, literature, sculpture and painting from as many corners of India as possible and also by personal survey.

And this brings us to the first problem : what is India ? Politically, the boundaries have been fluctuating, and hence these can be no standard. There are always cultural overlappings and overflowings. Invasions into the subcontinent and the expansion into Greater India pose problems of cultural limits and migrations. It is therefore necessary to leave the word 'India' undefined and to take it generally to be a geographic-cultural 'unit' spreading from Kashmir, the Himalayas, the hills of Assam, the deserts of Rajasthan down to the peninsula bounded by the ocean on three sides.

As we survey the history and the geography of this subcontinent it becomes only very evident that the greatest mistake we are liable to make is to treat Indian society as monolithic in origin. The textual scholar is prone to this bias and forget the people who have contributed to the formation of the culture. What is required is the ethnological approach and an examination of the tribal and folk ways of life : the unwritten history of the land. Written evidence is only a static report of instants of time. These and related subjects are described in the first two chapters.

There are many basic queries that have to be asked and answers found—even if tentatively. One such question is, what is a musical instrument ? In discussing this, one is faced with the fact that at very early stages even 'music' defies definition. Instruments also therefore border on the 'non-musical,' at primeval levels. Fire-making implements, the hunting bow, animal traps, pots, pans and so on are used as instruments, though it is evident that they were not designed to be thus employed.

In studying the history of instruments one of the most baffling aspects is nomenclature. Often a whole class of instruments have one name, as for instance, *maddalam* or its variants. It may refer either to the *madal* of central India or the concert *mridangam* of south India. The word *mridanga* itself connotes the southern concert drum, the northern *pakhavaj* or even the *khole* of Bengal and Assam. Instances can, of course, be multiplied. There is the conspicuous case of the *bheri* : a drum or trumpet in India but a gong in Indonesia. We are thus faced with a tricky situation and that is, the name and instrument may travel together or may migrate separately.

Another area of evidence is that of visual representation ; sculptures, reliefs, murals, miniatures and so on. We have an abundance of such sources right from prehistoric caves and the

Indus valley scripts to later sculptures and paintings. But how far are they reliable ? Can we accept them as depicting contemporary instruments ? Even if we do, to what extent can we depend on them to be realistic and to what degree does not stylization by the artist distort the structural accuracy of the instruments ? This aspect requires very careful examination before we can consider such material as evidence for a logical construction of organological history.

The classification of Indian instruments is yet to be done in detail. So far the most general grouping is the fourfold one : *ghana*, *avanaddha*, *sushira* and *tata*, adopted by Bharata. This ancient division has not been bettered and the best that Western musicology could achieve—the Hornbostel-Sachs system—is exactly the same as this age-old Indian scheme. But depth classification has yet to be formulated. A good attempt was presented in the catalogue of folk instruments published by the Sangeet Natak Akadami, New Delhi. However, apart from listing folk instruments, it does not touch concert or historial ones. (This was, of course, neither its purpose nor scope.) A depth taxonomy has been attempted here, perhaps for the first time, including as many instruments as are known.

The book is arranged in the order of *ghana* (idiophones), *avanaddha* (membranophones), *sushira* (aerophones) and *tata* (chordophones). Each chapter commences with a brief and general introduction, a schedule of classification, followed by detailed descriptions of important instruments in the various species. Every one of these classes presents interesting and provocative problems. For instance—to mention only one—to what degree did the harps shape Indian music and musicology ? Why did they disappear ? When did the fingerboard *veenas* come and when were they fretted ? What are the psychological factors which contributed to the emergence of the drone ? How is this related to the development of the *mela* system of scales ? These and such other questions are fundamental in Indian musicology. It is regrettable that this dynamics has rarely been thought over ; and what is even more regrettable is the isolation of organology from the total picture. It is very necessary to emphasize that the structures of instruments considerably influence the music and musicology of a culture and *vice versa.* Indeed, it is obvious—to me, at least—that the whole theory of *sruti*, *grama*, *murcchana* originates, is sustained by and ends (?) with harps ; the theory of *mela* is a specific contribution of fingerboard instruments.

This book is, then, an attempt to collect comprehensive data about Indian musical instruments—classify them, relate them to the general ethnic movements in the country and present a critical history. Evidently, the information cannot be exhaustive ; the country is too vast and old for any one person to grasp its totality and describe it completely. New facts should and will be garnered. And they may even change many of the opinions expressed here. But that is just what is needed—an intelligent enquiry. The author therefore presents this work as an invitation for further research.

CHAPTER II

CULTURAL BASIS

One of the greatest impediments in the study of Indian history is the 'classical bias' of most historians. This has led to the concepts of the monolithic origins—usually Aryan - of Indian civilization. That *vedic* thought and philosophy have unimaginably deep and lasting hold on the Indian mind is only too obvious. But it would be wrong to take them as the *sole* sources and guiding factors. There were, surely, pre-*vedic* peoples who had also contributed considerably to this milieu which is the 'Indian way of life'. Similarly the social attitudes and the material culture have also been led by the Buddhist and Jain religious precepts ; later on came the Islamic and the Christian. To understand, then, the unity and the diversity of Indian society, one must be constantly aware of the fact that this civilization is really a confluence of many currents and the unity is the result of ages and ages of cultural interactions. Because also of the extreme climatic, geographic and ethnological differences throughout the length and breadth of the land, India is as diverse as it is unitary. The history of Indian social order, therefore, has to be described in terms of the dynamics of centripetal and centrifugal forces : centripetal unification which has brought in a degree of commonness and the centrifugal which brings in its wake a degree of differentiation. Besides these two there have been isolated pockets—notably the tribal belts—almost static for centuries on end.

The directions of flow of cultural currents have necessarily been determined by the geographic elements of the subcontinent. The Himalayan barrier and the mountain ranges of Afghanistan have effectively prevented a fast and continuous migration—to and fro—in these areas. Those clans who did penetrate into the more southern regions stayed on, to be absorbed into the local society. The other deterrent for quciker mingling of peoples from outside is the long coastline which encloses the peninsular hinterland. While these walls of rock and water have stood in the way of foreign incursions—though not as completely isolating agents—they have been greatly responsible for keeping together the cultures within this circumscribed land as a more or less unitary complex. Any invader who did come quickly settled down and was soon merged to form another thread in the general design of Indian life.

The terrain exhibits a variety of geographic and climatic conditions that go to make for a variety of living. At utmost north are the snow capped ranges with their sparsely populated mountainous plateaus. The alluvial valleys of the Sindhu and the Ganga have provided a stable cultivable land. This reaches onto the forested hilly tableland of the Deccan which has furnished a safe refuge for many tribes, isolating them from other currents of culture. The narrow coastal strips of South India have bred a maritime people, settled in ways of living but yet trading with Arabia and Egypt on one side, and the far East and Indonesia on the other.

But the country that is now known as India was once a part of a larger continent, connected to Africa and Australia. It is suspected that many areas of Northern India were submerged under an ocean. This geological and, later, *vedic* geography has yet to be fully worked out ; only then can one get a more complete picture of the growth and change of this part of the earth through the millennia.

The racial admixture is also equally multifarious. The earliest inhabitants were probably the Negritos, traces of whose characteristics are to be found among the Kadars, Pulayans and Malasis of the extreme south. Indeed, these people of dark skin and frizzly hair seem to have been the early settlers of South-East Asia. Next came the Proto-Austroloid, a pre-Dravidian stock. Their origins are taken to be the West, though an Australian lineage is a possibility. The proto-Austroloid tendencies are to be found among the Veddas, the

Malavetans, the Irulas, the Sholagas and the Paliyans—again of South India.

The Dravidians have contributed both in extent and depth to the formation of Indian culture. Lacking in the mobility of the Aryans, they were an agricultural race, living a settled life. Whether these people came into the subcontinent from the northwest or were local is a disputed point. Slowly the invading Aryans blended with the "true black indegenes of the peninsula to form the Dravidian stock" and today they form the substratum of the major population of south India. Another hypothesis is that seafarers from Egypt reached the Indian shores in about 1600 B.C. The mingling of these with the local races resulted in the Dravidian. According to Salter, a branch of the Mediterranean race came to India through Mesopotamia and Baluchistan to evolve the Dravidian culture in the new clime—much before the Sumerian civilization. It is also believed that the Dravidians came to this country in about 2000 – 1600 B.C., by the sea-route, at about the same time as Aryans, and made the southern peninsula their principle habitat.

The Mongoloid strain extended from Indo-Burmese border, covering Assam, Bengal, Bhutan and Sikkim, contributing its own to the cultural texture.

Finally we meet the Aryans. A pastoral and agricultural people, they entered India through the north-western mountaineous gaps and some of their early branches came by sea up into the Sindhu river. The invaders spread eastward along the Gangetic valley and got distributed from Central Afghanistan and Baluchistan to the plains, eventually intermingling with the populace of the area.

Thus gradually emerges an Indian culture with its various strains ; and the aeons have produced a more or less uniform pattern of life. Yet, even today there is a baffling variety and diversity. The Kathkaris of the Western ghats or the Mundas and Oraons of Bihar who are barely out of foodgathering stage are contemporaneous with the jetset of the metropolitan cities.

The culture becomes a curious conglomeration because "Not only did advanced immigrants influence aborginals in every part of India but the new comers...generally took over some indigenous and aboriginal beliefs and customs". Such being the case, it is necessary to reiterate the statement that Indian culture is *not* monolithic.

The earliest stage of particular interest to us is the Indus valley civilization. But much of our knowledge about it is controversial ; for, this civilization which existed from 3000 to 2000 B.C. is still posing the problem of its non-Aryan nature. It is surmised that it was essentially Dravidian and pre-*vedic*. It was a highly urbanised culture and surprisingly static. However, these peoples had trade relations with Mesopotamia and exported copper to West Asia, the route of communication being oceanic. The contribution of this society to the later orders is basic and remnants of its customs are still evident : for instance, the three-headed god shown in the Indus seals might well be the later Pasupati (Siva). The end of the cities came soon after 1750 B.C. ; the inhabitants were slaughtered and settlements set on fire by the invading Aryan hordes. Then there is a gap of nearly six hundred years before we come to the townships established by the new cultures.

The oldest information on the Aryans and their ways of life is in the *vedic* literature. Of these the *rigveda*, the earliest, was prepared about 1500-1200 B.C. in the Punjab ; it is also known that there were two waves of Aryan invasion in the second millennium B.C. and that they came from near about Uzbekistan. But who were these Aryans ? The tribe immediately related to India had their homeland in Persia, as can be seen by the common gods worshipped : Indra, Varuna and Mitra. The *Avesta* also mentions the land of seven rivers, the Punjab of today. In any case, the Aryans seem to have belonged to a large common stock of people extending from Greece to China, through Central Asia. For instance, *Manus* (of India) are equated with the Mediterranean peoples, Mens or Minos. The Caspians are said to be same as the Aryan clan of *Kashyapa*s. Again, the Hittite word with the Aryan base *Khatti* is possibly relatable to the Sanskrit *Kshatriya.*

The Aryans, as presently accepted, are said to have destroyed the cities of Indus valley and with their superior mobility (horses and horsedrawn chariots) conquered, in time, the original kingdoms and tribes. The peoples they met were described as 'dark' (*krishna*) and "noseless" (*anasa*) ; they are also referred to as *dasyu*, which later on came to mean a slave. Indeed, Krishna in the *rigveda* is demonic enemy of Indra ; the word is probably also a generic name for the dark-skinned pre-Aryans who resisted the invaders. Naturally, the conquerors met defiance from other quarters like the *Naga*s, the aboriginal forest dwellers. However, gradually there was close mixing of the races by inter-marriage, military submission and the foreigners themselves settling to agriculture and trade. A civilization and culture of a certain commonness of thought, philosophy and art emerges which comprehensively is called 'Indian'. The spread of *vedic* Hindu thought, Jain and Buddhist religious ways bring in a degree of stability to the whole of the subcontinent. The imperial Houses of Mauryas, who effectively stemmed the Greek advance, gave greater stability to the state which was further consolidated by Asoka (273-232 B.C.), succeeded by the Gupta age (320-530 A.D.) which is one of the most magnificiently glorious periods of Indian history.

The story of South India had its own lines of unfoldment and quite probably its earlier stages were not deeply related to North India (*aryavarta*). The Sanskrit epic *Ramayana* (400 B.C.) alludes not only to Kiskinda (modern Bellary) but even to Java and Sumatra, which is a recognition of two facts : that there were cultures earlier than the Aryan and that the Aryan contacts had already started influencing them in South India by this time. While the Mauryan Empire included areas upto Mysore, the kindoms of Chola, Chera and Pandya were independent of the Imperial Power. The organization of society was non-Aryan and the remnants of totemic worship so characteristic of this culture can be seen to this day. But by the fourth century A.D. south India gets highly 'Aryanised'.

The process of exchanges and interchanges of cultural patterns was through military conquests, religious missionary work like the Jain, the Buddhist and the Hindu, as well as commerce and trade; for besides the tribal and social movements already discussed, there were two important trade routes—*uttarapatha* from Taksila to Rajgir and the *daksinapatha* from Savatthi to Paithan. And along these routes of commerce, as well as routes of conquest must have moved the arts.

We find, then, on the subcontinent a conglomeration of cultures with a sense of onenesss. but yet with staggering regional differences. This was also a civilization which had seen glorious and creative periods but which had become stagnant and complascent. And then came the organized Central Asian (the 'Islamic') invasions which shook the country and affected its way of life drastically.

The first important invasion of this period was that of Mohammad Ghaznavi at the beginning of 11th Century A.D. But till the stabilization of the Mughal empire (16th-17th Century) the condition of the country was in a flux. With no central or unitary rule and with warring smaller kingdoms, there was constant migration of peoples; and a significant one was that of Hindu scholars, poets and musicians to southern areas where the hand of the iconoclastic invader could not easily reach. From the last days of Ghaznavi to the coming of Mohammad Gori in 1191 A.D. the main influence of Islam was in the Punjab. But by about the 13th century almost the whole of the subcontinent was affected more or less by the culture of the new rulers. Literature, architecture, music and social life in all venues felt this dominance; and very novel trends of positive absorption and militant reaction came to be felt. In music we come across new *ragas* (*Yaman*, *Turuska*, *todi*), new styles (*kheyal*, *tappa*), and new instruments (the *rabab*, the *sarengi*).

However, a kind of integration is again achieved and somehow the country gets a sense of a vague oneness. Yet regional, social and religious differences are still prominent. The agressive Rajputs who steadfastly opposed even the invincible Mughals, the grand Vijayanagar empire (1336-1565 A.D.) as well as the Maharashtrian kingdom of Sivaji and his successors were all, for instance, havens of Hindu culture where were forged links with pre-Islamic past; and there were men like Emperor Akbar who knew the necessity for producing an atmosphere conducive to creative cultural unity. But the implications of the older *yoga*, religion and art were lost, in the main. Earlier occultic intuition rested with a few and the only forceful expressions of survival were the *bhakti* movement of the Hindus and the closely similar *sufi* movement of the Muslims.

At the end of the 13th century Marco Polo visited India and in 1498 A.D. Vasco da Gama opened new trade routes. With that started the inflow of European culture to this land, on a large scale. In the vanguard were the traders, followed by the military conqueror and the religious missionary. In 1510 the Portugese occupied Goa, in 1600 the British founded the East India Company and the French settled in Pondichery in 1674; and these were the beginnings of new currents in Indian culture. As the Western influence grew, the effects of Christianity, methods of education, technological and scientific thinking and production went, in varying degrees of depth, into the life of the nation. Today the way of life, though having its base in tradition and in spite of attempts at its revival, is guided to a large extent by pulls from the West.

Thus it is very obvious that the civilization of this land can in no case be considered monolithic. The extent of the country the variety of its geographic and climatic conditions, the multiplicity of ethnic groups and the long history of the peoples with periodic disturbances have all made the cultural milieu a highly conglomerate affair. But its geographic position has also rendered it isolate for centuries ; this has given it time enough to evolve a unity—the Indian way of life—which, at once, exhibits a disturbing diversity.

To believe in or assume, therefore, a single origin—*vedic* or any other—for any cultural phenomenon in this country would be wrong. What we have is not one culture being divided into regional varieties but many parochial strains coming together to grow into one commonness. The 'classical bias' so usual and characteristic of Indian scholarship has failed to recognize this. A typical example is that of the Hindu calender. For instance, the months *Chaitra* and *Vaisakha* are, according to the almanac, for the spring. But surely spring does not come at the same time to the whole of India ; and yet this dutifully taught to every child. Again, with the methods of transportation and communication prevailing in ancient times, how could there have been one kind of pattern of life throught such a vast land ? Even today, with the facilities of modern means of communication—road, rail, sea, air, radio and the press—the 'nation' is still a concept not always evident in reality. The peoples of the Himalayan snows are nowise related to the dark forest dwellers of Andhra. Food habits of the Kashmiri are evidently different from the Tamil's. The sophisticated jetset of Bombay or the bureaucrat of Delhi has little in common with the villager of the interior. Notwithstanding such differences and divergencies, a unity and similarity have yet grown, due to the social exchanges through the ages. Tribes and races have mingled ; religious concepts and practices have become common ; Siva has, for instance, come a long way from the Indus valley godhead to the later Brahmanic God. *Bhakti* and *sufi* mysticism have come closer. Sanskirt has much of Dravidian and Austric substratum ; and the Dravidian languages have similarly borrowed extensively from the Indo-Aryan. Here then is a country that is multiethnic and polyglot, with isolated pockets where history has stood still and the metropolitan cities with their hybrid 'elite' and sordid slums. The nation's culture has also, then, to be studied and understood as such : a multifaceted milieu with forces at once centripetal and centrifugal, uniting and dividing the people.

Greater India

Just as various migrations took place into India, so did Indian traders and armies go out and carry with them the social patterns of this country. This expension and settlement is the Greater India.

It is an established fact that India was on the route of ancient human migration and trade. We know, for instance, that the Indus group of cities was called 'Meluhha' by Mesopotamians and it is also surmised that there might have been a settlement of Indian traders in ancient Mesopotamia, the trade route being the sea. Maritime contacts existed between south India and Middle the East from at least 1200 B.C. : logs of Indian teak have been noted in the palace of King Nebuchadaenezzar of Babylon (605-562 B.C.). By 305 B. C. cultural contacts between Greece and Hindustan had been established.

To the East also there had been early migrations. It is supposed that in prehistoric times Austronesian tribes went from India to Malaysia ; and, perhaps, it is no accident that Moken tribes of Margin Islands, of Malaya, bear a name similar to the Mukyan caste of boatsmen of Kerala.

There are, however, certain attested cultural movements of pan-Indian character which are worth noting.

To the far East, the contacts between India and China are very ancient. As a matter of fact, the word *China* is derived from the Sanskrit *ceena*, and the Chinese nobility's appellation, *mandarin*, is said to have its roots in *mantrin*, again from Sanskrit. The Chinese knew of India as *Shen-ton* (Sindhu, India). Even by 2nd Century B.C. Indian tales had spread to China and in 218 B.C., it is believed, missionaries of Asoka were sent to that country. The sojourns of Fa-Hien in the 4th Century A.D. and Huen Tsang in the 7th to our country are only too well known.

Similarly the exodus to South-East Asia is one of the best documented chapters of Greater India. Indeed, when one generally talks of Greater India, it is this region that one has in mind. A systematic colonization of Annaam, Cochin-China and Pacific Islands commenced from 1st Century A.D. ; Java and Sumatra were known to *Ramayana*. But it was from the 8th to 15th Centuries that we find a dominant Hindu Empire in Indonesia. As for Ceylon, it has rarely been considered culturally separate from the peninsula.

To the west, Gandhara—present Afghanistan—was known to Indian Aaryans even at the time of *rigveda* and a Gandhara village is said to be the birth place of Panini, the great Sanskrit grammarian. It was the gate through which Northern invasions into India invariably took place and through which caravans from India plied their trade.

This, then, is a brief outline of the growth of Indian civilization, in the subcontinent as well as outside it. It is with this backdrop that the arts of this country have to be viewed. To pretend that all knowledge was the property of 'Indians' would be too foolish ; but the other extreme of tracing every strand of life as imported would be equally illogical.

The music and the musical instruments of India—their beginnings, migrations and evolution—particularly the contributions of various cultural groups to the general pool, have then to be studied with this background of the history of this land.

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CHAPTER III

ETHNIC AND CULTURAL HISTORY OF INSTRUMENTS

The social and other forces so far described and discussed are reflected in the development and movements of instruments. It is not possible to trace in all details the ethnic relation of music and musical instruments ; for, enough data are not available. In the present state of our knowledge it is but a general and limited statement that can be made.

As must have become evident, the present state of Indian society is the outcome of the various confluent currents of human migrations. In effect, it is eclectic and *not* monolithic. This is being emphasised repeatedly as Indian musicology has all along been 'classically biased' and has traced all its material to one source : Vedic, Aryan. One work written in one area of India two millenia ago—Bharata's *Natyasastra*—is taken as the source book for *all* Indian music. Obviously, no *one* in those days, with poorer means of communication, could have known *all* the music of this vast subcontinent, much less described it as *one* system. Even today, in spite of the radio, the gramophone and printed books, we have two distinct systems of art music —Karnatak and Hindustani. The error is evident : it is of living in an idea (of *one* source) as against in *actuality* (the existence of multiple origins). If at all we treat and accept Indian culture and music as one—and certainly there is a unitary feeling in both—it is because of the enormous age of this society which has had time to grow into an 'Indianness'. As for music, the essential unity is that Indian music is melodic—but then even the concept of *raga* matured perhaps only by the 5th Century A.D.

The tribal contribution to the music of our country can be observed in the names of some *raga*s. For instance, *Chenchu Kambhoji* is indicative of its relation with the Chenchus of

Andhra and perhaps to the Kambhoja area. Even during the time of Matanga (5–7th Century A.D.), this cultural contact was in progress. In his *Brhaddesi* he says, "No classical melody (*marga*) can be composed from four notes or less ; melodies with notes less than five are used by tribes such as Savara, Pulinda, Kambhoja, Vanga, Kirata, Valheeka, Andhra, Dravida, and forest dwellers", though some melodies like *Andhri* had already attained the status of classical form (*jati*). Other *raga*s with such ethnic and regional associations are *Malva*, *Gurjari*, *Saveri* and *Bangala* ; *Botta raga* is said to be the tune of *Botta desa* or the Tibetan area, *Takka raga* of At-tok on the banks of the Sindhu river ; *Bhairava* and *Bhairavi* are conjectured to have been based on the music of the Bhairava tribe. Instances of such kind are sufficiently widespread to validate the assumption that the nuclei of many of our current *raga*s had definite non-Aryan sources.

The most primitive instruments are naturally to be sought for amongst the cultures who form isolated enclaves to this day. And even here it is, perhaps, more logical to take the idiophones to be the most ancient. As an example, we may consider the scraper or rasp. It is found among the Savaras—one of the oldest ethnic population we know of—as *doddu rajan* and among the Pulayans of Kerala as the *kokkara*. What is of interest is that the instrument looks verymuch like the fire producing implements of early societies such as the Paniyans of Kerala. Again, some authors are of the view that the flute was an invention of the Savaras. Also, the bow is said to be the creation of the Negrito, the strains of which race are still to be found in South India. One may be permitted to speculate that the Negrito might have also invented the bow shaped chordophones, examples of which are to this day found amongst the tribes of Africa. It may not altogether be an accident that the bow type instruments are extant in the southern areas of our country—the *villaḍi vadyam* and *villu kottu*—which has a considerable population of the Negrito. Another instance is the typical drum called the *madal*. This type is found with the Santals, Oraons, Baigas and Ghasias —all non-Aryan peoples of the Central Indian belt. Obviously, then, a careful study and mapping out of the instruments of the tribes will eventually give us a good picture of their origins and migrations.

Pending an unequivocal conclusion, we shall here consider the Indus valley civilization as pre-*vedic* and hence non-Aryan, most probably Dravidian. Of the music of this culture we know nothing. But of their instruments, evidence is available mostly from the seals excavated. Hour-glass drum similar to the *hudukka*, cylindrical drum, castanets and cymbals have been noted. Of particular interest is the arched harp or the bow shaped harp. This instrumental symbol has also been found in some of the heiroglyphs. Clay whistles have been unearthed in these sites. The drums and whistles were in all probability earthen. But we may only conjecture about the material of the stringed instruments. Perhaps the arch was of wood and the strings of grass or animal gut.

Assuming that this civilization was ethnically related to the ancient peoples of South India, we may discuss some of the older music of this area. Of course, Tamil Nadu, Kerala, Mysore, Andhra, Southern Maharashtra, Central India, and parts of Orissa should be treated as a unit for this purpose. However, the oldest literature available is the Tamilian, from about the 2nd Century A.D. The word *isai* is referred to music in general and musicians were generally called *panar* or *perum-panar*. The standard scale is said to have been that of the present *Harikambhoji* (*Sa*, *Ri*, *Ga*, *Ma*, *Pa*, *Dha*, *ni*). The melodic equivalent of *raga* was *pan* and the term corresponding to the *sruti* was *alagu*. The system of modal shift (*moorcchana paddhati*) was known as *palai*. The important instruments were the *yazh*, the *kuzhal*, and the *maddalam*. The *yazh* was a kind of harp ; the *kuzhal* was a flute ; and the *maddalam* was a drum. The word *maddalam* may be significant, with a pointer to the *madal* of Central Indian tribes. The same word has variations as *maddale´* (Kannada), *madol* (Bengali), *mandar*

(Hindi) and *mardal* (Sanskrit). It is in such cases that we really meet difficulties of tracing the origins of instruments, for the mutual influences are very ancient and the linguistic exchanges between Indo-Aryan and Dravidian are deep and far reaching. Only a very careful study of the etymology of the names can help us. Indeed, even the earliest Tamil literature on music available to us now shows mixture and/or substratum of Sanskrit. For example, the names of *pans Panchamam* and *Gandhara panchamam* definitely reveal Indo-Aryan sources. I suspect, therefore, that the present day Karnatak music is based on the ancient pre-Dravidian and Dravidian musics, with a strong colouring of later Aryan systems. To this we will revert later.

As the Aryans invaded India some 4,000 years ago, they brought with them their music, the earliest records of which are the *vedic*. *Rigveda*, the oldest of the four *vedas* (2500 B.C. at the latest) is a simple recitation with three tones (or tonal regions) : the *anudatta*, the *svarita*, and the *udatta*, each separated from the next by a tone (three or four *srutis*). The *Samaveda* which is a more elaborate chanting of the *Rigveda* has seven notes arranged in certain degrees of descent and ascent. In the main, it is a descending music, starting from a high pitch and cascading down. This is a characteristic of all early music and is closely related to the psychophysiology of music and musical instruments, as we shall discuss later (See Ch VIII). The *vedic* chants were ecclesiastical in purpose and hence highly symbolic, not easily permissible of change. In the rituals and sacrifices, various musical instruments were used to accompany the chant. As the priests (*udgata*) sang, their wives played various kinds of *veena* of which there were many kinds : *bana veena*, *karkari* (?), *kanḍa veena*, *apaghatila*, *godha* ; but we are not clear about the construction and tuning of these. One may only suspect that they were harps or dulcimers. The drums mentioned in *vedic* literature are the *dundubhi* and the *bhoomi dundubhi*, the latter being more primitive. Other membranophones which find mention are the *adambara*, *lambara*, and *vanaspati*, though no details are available. Among the wind instruments were the *toonava* and *nadi* (*nali*), the flutes. *Aghati* of the *veda*s was perhaps a metallic cymbal, but a stringed instrument according to Sayana (14th Century A.D.).

Along with the spread of the Aryans, the influence of their music also extended throughout the country. We find the terminology and nomenclature in music becoming more Sanskritized and a significant indication of the religious and the profane is found in the *Naradi siksa* (1st A.D.). It is also a very important reference point, as it gives one of the earliest measurements of the *vedic* scale in terms of the flute scale used in profane music (*laukika sangita*). From here on all later texts deal only with secular and regional (*desi*) music. A land mark in this direction was the *Brihaddesi* of Matanga (5th–7th Century A.D.), a compendium on *desi* music as its name implies. Here, perhaps, is the first mention of *raga* proper, which concept gradually replaces the earlier melodic ideas of *jati*, *jatiraga* and *gramaraga*. We are definite, once more, that this Aryan biased music strongly influences and even displaces to some extent the indigenous South Indian art music, for in the rock cut inscription of Kudimiyamalai in Tamil Nadu (7th Century A.D.) we come across the note signatures of *Sa*, *Ri*, *Ga*, etc., and/or their variants.

The same 'unity' of culture could be ascribed to the 'unity' of Indian music from this period on. Because of the fact that both non-Aryan and Aryan music were melodic, an integrative exchange of concepts and practices could take place. What, in all probability, happened was the intermingling of musical forms and styles basically melodic and rhythmic but with local differences. Indeed, this was the very meaning of *desi sangita* : that which varied from *desa* (country, area) to *desa*. As an outcome of all this we have now have two systems : the Karnatak and the Hindustani. It is offered here as a suggestion worth examining that various styles of south India, essentially based on ancient Dravidian and other non-Aryan art, and highly influenced by Aryan music have come to form one system—the Karnatak. Another group of non-Aryan styles, again very deeply affected by Aryan and later on the Central and the West Asian music is the present Hindustani system. Naturally, along with this 'Aryanisation' travelled the race's instruments and/or their names : *mridanga*, *veena*, and so on.

The difficulty of tracing the sources of instruments becomes evident even at this stage. For the intermixture of races and cultures has been so extensive that shifting the available data is a strenuous and tricky task, and one has to be aware of the material in ethnology, linguistics, written and unwritten history, and literature. Till we possess the results of careful and intensive research of every instrument, considering all these and other aspects, any ideas about its origin and migration can only be tentative. The difficulty is of disentangling the ethnic sources, for often it is only the name of an instrument which has travelled, but perhaps not the actual implement ; and this is the case with even the familiar ones like the *veena*, *mridanga* and *madal*. We shall come back to this later while discussing problems in nomenclature.

The coming of the Central and West Asian hordes, mainly from the 11th Century onwards, opens up a new chapter in Indian music and organology. Alien music, particularly Persian and Arabian, began to make its influence felt and eventually gave a strong colouring to the entire music of this country to more or less degrees in different areas. It is true that the music in upper India felt this impact more, due to its geographical and political position. But even the South did not fully escape it, though situated farther from these trends. The new musical school which seems to have been called *Indraprastha mata* (the Delhi school) was characterised by (1) the classification of Indian *ragas* on a method parallel to the Iranian *maquams*, (2) the creation of *ragas* with Indian names but being admixtures of local and foreign melodies, and (3) *ragas* having older names but newer tonal structures. The most revolutionary consequence was the establishment of the twelve-tone scale in place of the ancient *moorcchana paddhati* or modal shift. The effect on instruments is much pronounced as a remarkable and emphatic change takes place. The harps and dulcimers, essential to the system using modal transposition, disappear from the musical scene and, as the concept of *grama* itself vanishes, being replaced by that of *mela* or *that* of twelve tones, fingerboard instruments become popular. Even here frets, which perhaps were moveable in earlier *veenas*, become fixed. Besides, new instruments gained currency, as for example the *tabla*, the *sitar*, the *sarode*, the *sarangi* and the *shehnai*. Whether these instruments were imported totally or whether only the names began to be applied to indigenous ones is a question that requires careful examination without bias.

While upper India came under a strong influence of the Iranian styles, the Deccan was not completely insulated. By the 13th Century the overwhelming effects of Muslim invasions and migrations are evident in this part of the country. Sarngadeva, a Kashmiri brahmin, produced in that century his immortal *Sangita ratnakara*, a work that can be considered as the last one describing older modal music. With the founding of the Bhamini dynasty in 1347 A.D. the expansion of Muslim art becomes more extensive in the south. For example, Vidyaranya (15th Century), one of the founders of the Vijayanagara Empire gives as one of his *melas*, *Hejujji*, a word derivable from the *Hijaj maquam* : and Hijaj is an area in Arabia. More important, he was also the first propounder of the *mela* system of *raga* classification. This has inextricable relations to the history of musical instruments ; it implies the emergence of the fingerboard lutes and zithers with frets, replacing the older harps. Eventually, the frets become immovable giving us the *sarva raga mela veena* : the *veena* which has the potentiality to produce *all* notes required in all *ragas*. The present day *veenas* of the North and the South (not the *sitar*) are of this type.

This is the second crucial change in the history of Indian music and organology. Of the Dravidianization of India and its influence on our music we know very little ; of the Aryanization of the music and instruments of the country we have fairly extensive knowledge. Indeed, much of Indian musicology describes this process, very often without explicitly stating so. The third stage is the post-13th century and almost all musicologists are of the opinion that from this time on Indian music which was formerly 'one' began to 'bifurcate' into the Hindustani and Karnatak systems How far our music could have been 'one' we have already discussed ; in a vast land with poor means of communication, with geographical variations of enormous range and with ethnic groups of staggering differences of social standards, to expect 'one' music would not be logical. The 'oneness' that was there was, in the fact, of the music being melodic with suitable instruments being used. The aeons of living together has brought a high degree of cultural and musical integration. It was this music—different in different regions, and having distinguishable variations—but with a sense of oneness— that was influenced by the Iranian system : more in the North and less in the South. It is therefore not a question of bifurcation at all ; for the 'one' music of the musicologist has its roots in books and the classical bias. The actual art is more dynamic. A set of styles have coalesced into the present Hindustani music and another in the Karnatak. With faster means of communication we may now expect a further fusion and sometime in the future have 'one' Indian music with regional variations : the 'oneness' implying again 'of being melodic' with certain broad commonness in the concepts of *raga* and *tala*.

With the arrival of Western—particularly the British—culture certain changes in our music have taken place, which may have far reaching consequences, if permitted to spread. The main effect has been of the technological and the resulting faster methods of communication : the radio, the gramophone and the printed book. These are bringing far flung areas closer ; differences are disappearing and a tragic monotony is setting in. There is a greater exchange between and mingling of both folk and art music of the south and the north. The country is tending to 'oneness' – at least in music !

Of the musical instruments from the West two are the most noteworthy : the violin and the harmonium. The introduction of the violin to serious music is attributed to the Deekshitar family of musicians to which belonged Muttusvami Deekshitar (1775-1835 A.D.), one of the noblest composers of this country. Tradition has it that Balusvami Deekshitar—Muttusvami's brother—learnt it from the musical band attached to the British Governor, Pigot, at that time in Madras. The disciple of Deekshitar, Vadivelu (one of the four Tanjavoor brothers), became an accomplished violinist and his position as the Court Musician of Travancore might have helped to popularise it. Indeed, he was honoured by the King of Travancore with the gift of an ivory violin. Other early names connected with the spread of this instrument are Varahappa Iyer, Tanjavoor Subba Iyer, and Tiruvenkadu Sivaramakrishna Iyer. The violin has now become a solo instrument and an indispensable accompaniment in South India where it is colloquially called *piteelu* or *pitlu* (corruption of 'fiddle'). Even in the North it is fairly well known and used, being termed *bela* or *behala*—an obvious linguistic relation to viola and violin.

The harmonium – Rabindranath Tagore called it "the bane of Indian music"—is the only keyboard instrument which has invaded our music in a big way. Its popularity is considerable, particularly in the north where it is used—and often preferred – even on the concert platform. Fortunately, it has not encroached on the domains of good Karnatak art music. Its portability, the lack of any necessity for on-the-spot tuning, loudness and comparative ease of technique have made it widely popular and ubiquitous. It has spread like a wild fire and destroyed much that is beautiful in Indian music, for it has many insurmountable disadvantages. Because of the tempered tuning it can never give the finer pitch variations so necessary for our music. Being a keyboard instrument, it is not possible to get any kind of *gamaka* (graces) out of it. Attempts are now afoot towards the construction of electronic harmoniums which can give *sruti* differences. One can even produce good Indian music without *gamakas*, as in a *svaramandal* though this does not come up to current concepts of the melodic and pitch variations in our music. But how to construct an instrument which can give the almost infinite *sruti* differences in the same *raga* ?

Another instrument which is also gaining some foothold in art music is the clarionet imported from the West. Here again, the employment of keys to close and open the holes prevents its being really suitable to our music.

The other major borrowals from European culture are the brass band and 'orchestra'. The former is more urban in habitat and can be seen commonly in marriages and social processions ; the 'orchestra' is only urban. The bands usually consist of clarionets, trombones, trumpets and drums with the harmonium or the accordian thrown in for effect. A generation ago it was the height of sophistication to have police or 'palace' bands play in public parks—a dignified imitation of the British Governor.

The orchestra (usually translated as *vadya vrinda*) is again a new idea from the West, though instrumental ensembles are very ancient in India. Such ensembles, called *kutapa*, were known at time of Bharata (2d century A.D.) who describes the *kutapa*, its arrangement and use in drama. And we have sculptural and pictorial representations of instrumental groups in Barhut (2nd Century B.C.), Ajanta (2-7 Century A. D.), Bagh (4-6 Century A. D.), and so on. While Bharata, for instance, has mentioned the details of the use of *kutapa* in drama, it was obviously used also in royal courts, religious and social processions, and auspicious occasions.

Simhabhupala (14th Century) has described three types of *kutapa*, classified according to the number of vocalists and instrumentalists. Apparently these were choruses with flautists and drummers accompanying the voices. But Bharata's *kutapas* were more elaborate with players of *mridanga*, *panava*, *dardura* (all drums), flute and *veena* (harp), besides men and women singers. *Natya sastra* also gives the *pratyahara*, that is—the arrangement of the members of the *kutapa*.

It is clear from both the nature of Indian music and the descriptions that the *kutapa* was a smaller instrumental ensemble than a sizeable orchestra. Of course, there was no question of harmonization at all. Even today there are temple and social ceremonies where such small sets of instruments as well as the less pretentious 'orchestras' of drama and dance troupes may be seen. Of such traditional groups the better known are the *panchavadya* of the south and Orissa, and the *melam*s of south India. The *panchavadyam* of Kerala usually comprises a *maddalam*, a *timila*, an *edakka* (*drums*), a *sangu* (conch), a *talam* (cymbals) ; sometimes a *kombu* (metal horn) is also used. In Orissa the corresponding ensemble employs a *jhanj*, cymbals, a *shehnai*, a *ghanta* (a metal plate beaten with stick), a *dhole* (drum) and a *sankh* (conch) or similar combinations. In both cases the emphasis on rhythmic instruments is obvious and significant. The popular *melam* of south India consists of *mukhavina* or *nagasvaram* (a couple of them) and drums—a *pambai*, a *tavil*, and sometimes a *dhole*.*

Orchestra of a bigger dimension is recent—a gift from the West. It is quite possible, as already stated, that the police and army bands of the British and the French might have been the beginnings of this trend. The Princely Courts used to maintain such ensembles which sometimes used to play classical Indian compositions. To-day, there are some schools training students in 'orchestral' music of sorts. But one of the major organisations which have orchestras is the All India Radio. This is a regularly maintained troupe of instrumentalists with full time composers and conductors. Almost every Indian instrument finds a place and even some Western ones. The compositions are generally based on *raga*s, and *tala*s, though attempts at introducing harmonic progressions are being made. The second and major field where Western music and orchestration have been widely applied is the films. Composers and directors of film music have been eminently successful in this direction ; not being inhibited by any grammar and with entertainment as their main purpose, they have leaned heavily on tone-colour and mass, so effective for their purposes but so undeveloped in the single-line melodic music of India. And to achieve the desired results they have used instruments of all types and origins, including the recent electronic ones.

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* This is not a detailed history of 'orchestra' in India, but only shows the antiquity of ensembles.

Pan-Indian Music

Indian musical migrations to the Far East have been both by land and sea, and the extent of influence has varied with history. The music of the borders of Western China—Kuchean music—had much in common with and was perhaps derivable from the music of India. For instance, the musical terms in Kuchean are said to have Sanskrit bases such as, *sha-to-li*=Sanskrit *sadharita*, *ki-shi*=*kaisika*, *shah-shih*=*shadja*, *sha-hou ka-lan*=*shadja grama*, etc. It is surmised that these terms were introduced into China during the 6th Century A. D. by one Sujiva. As for instruments, the murals in the caves of Tun-huang, an important Buddhist centre of 4th Century A.D, depict a number of Indian ones. Again, the Chinese bowed instrument, *hu-ch'in* is 'foreign' to that country and the word *hu* is applied to "native of India and elsewhere". Japan also received the chants of Buddhist monks from India. Some derive the Japanese *biwa* (traceable to the Chinese *p'pa*), a short lute, from the *vina*.

Other Far Eastern relations of Indian musical instruments can be seen in the pan-pipes of Assam and the *khene* of Laos. Indeed, the Laotian bowed instruments of *so* type are very similar to the *pena* of Assam and the *kenra* of Orissa.

Coming nearer home, we find a very close link between Indonesia—the *Yavadveepa* and *Suvarnadveepa* of ancient Indians—and India, particularly the eastern coastal cultures of the peninsula. The major period of contacts was what is called the Hindu period. The domination of Indian culture, commences from the early centuries of the Christian era upto about the 10th Century from which time Far Eastern influence gains ground and by the 15th Century Islamic culture pervades the area. It was during this Indian period, specially of the Sailendra kingdom, that a great migration of drama, dance, and music to Java and Sumatra from the parent land took place. A vast amount of evidence of this is available from the Chandi sari reliefs (circa 750 A.D.) as also from early epigraphic and textual material dating from 82I A. D. The reliefs and sculptures of Borobodour and Angkor Vat (8th-9th Century) as also texts like *Arjunawiwaha* (11th Century) and later ones give extensive information on instruments of Indian origin. For instance, the chief drummer in an ensemble was the *padahi manggala* (Sanskrit *pataha*) The *makara* (from the *makara yazh* of Tamilians ?) and *winipanchi* (*vipanchi* in Sanskrit) were a few chordophones of Indian sources. Of the aerophones we come across the *wangsi* or *bangsi* (Sanskrit *vamsi*, flute), the *kahala*, and so on. The Sanskrit *muraja* (and the Tamil *murasu*) drum becomes *murawa* or *muraba* ; the *dundubhi* was also used. Of the idiophones we have *genta* (Sanskrit *ghanta*), bell, and *bheri* a gong. This last is of particular interest, for in India the word *bheri* connotes a king of drum, or, rarely, a trumpet. Here then is a case where the *word* has travelled and been misapplied but not the actual instrument.

The very close cultural relations of Western Asia and India make it very difficult to sort out the mutual contributions ; for it is not very easy to decide definitely what has come in and what has gone out, specially the latter. That various concepts in mathematics, astronomy, and medicine went West from Hindu India we know. But in music we are on shakier foundations. According to Sylvan Levi, "the West owes its system of notations by the initial letters of the names of the notes to Hindu music...". Weber thinks that the Sanskrit term *grama* (Prakrit—*gama*), meaning a musical scale, is the root from which are derived the Arabic *jama ah* or *gama ah* (scale)), and through this the French *gamme* and English *gamut* (a scale of seven notes).

As for instruments, we are on an even more slippery ground, because almost all words known in North India have affinities with Arabic and Persian. We may, however, note the following : The first is the case of bowed instruments. Some scholars are of the opinion that the *ravanahasta veena* or *ravanahatta* of western India migrated to western Asia to become the *rabonostron*, the *rebec*, the *rabeb* and finally the violin. Another interesting case is that of the *kamanche* or *kamanja*, a bowed instrument referred to by Ibn al-Faqih (early 10th Century. A. D.) as being used by the Copts of Egypt and natives of Sind. It may not be too far fetched an idea to suggest a relation of *kamayacha* (India) to *kamancha* (Arabic) and *kamanga* (Egyptian). The *katyayani veena* is said to have gone over as the *qanoon* and the *sata tantri veena* as the *santir* to Persia and Arabia ; we still have the *santoor* in Kashmir. Lastly, we come to the *tunboor*. Again, it is a difficult question to decide its place of origin and pedigreenation. The word is believed to be Persian ; and the Arabs have the *tanbur*, a long lute. The *tanbur* has also, quite possibly, affinities to the *pantur* (bow small) of ancient Sumeria. *Pan* or *ban* mean a bow or even a harp. This becomes the Greek *pandora*. Again, the Assyrian *pandoura* was a three stringed lute. Sachs and others have given the orígin of these as the mid-West. But Abdul Razak Kanpuri is of the opinion that the original word is Indian *tamboora* which gets modified to *tunbura* in Iran and Arabia. This would mean that the whole set of lutes in the West owe their birth to Indian sources.

We now reach the threshold of the West. Indian dance and music troupes had begun to visit Europe during the earlier parts of this century and interest in Indian music has been growing there from then on. But within the last decade there has been a spurt in the West's desire to listen to and learn this art. Besides, the visits of scholars, students, musicians—and, of course, the ubiquitous tourist—from abroad, taking our music to their own countries, schools of Indian music have been established in Europe and more particularly in America where the *veena*, the *mridangam*, the *sarode*, and the *sitar* are being taught. The 'craze' has become too well known to require further elaboration.

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CHAPTER IV

GENERALIA

Definition and Evolution

"What is a musical instrument ?" While one can attempt to give an answer, however vague, to the question, the query implies others : "What is music ?" and "What is the origin of music ?" The latter is simpler to answer—at least, it appears so.

The probings are important, because the concepts of musicology and organology are, in their present state, highly sophisticated. For, at the earliest stages of man, music, noise, speech, and dance are all an undivided condition of motor impulse. Is, for instance, a screech accompanying primitive or tribal 'dance' music ? Yet it has a 'rhythmic' and 'melodic'—or, more strictly, an affective—spell, different from speech. It, therefore, seems to me logical to take an undifferentiated sound material as one of the communicative processes—both in humans and nonhumans—which later, in man, gets bifurcated into speech and music ; the former as a tool of conscious articulation and the latter for nonconscious expression. The division is never complete, for speech always retains a microstructure, particularly at levels 'below' intelligibility, and music has its own conscious alphabets such as 'notes', 'chords', '*raga*'-s, and so on.

Starting from the other end of the spectrum, as it were, Hindu philosophy expresses the whole of the acoustic material, and even the non-acoustic, in terms of the One Sound—the Primordial Vibration—called variously as *Nada Brahma*, *Omkara*, and so on ; hence, the metaphysical association of the flute (with Krishna), the *veena* (with Sarasvati), and the *damaru* (with Siva).

The primeval nebulous state of music is reflected in the early instruments which do not produce any definite 'musical' sounds.

Of this type are the scrapers and rasps and seed rattles. The sound emitted by scrapers is definitely 'noisy' and the instrument itself is found mostly with the primitive tribes, as, for instance, the antelope horn scraper of the American Indian and the *omichicahuaztli* of Mexico ; in our own country we have *doddurajan* of Savaras and *kokkara* of Kanikars. The earliest instruments, again, are both musical and nonmusical in function. Musically the association is inseparable from dance and hence also rhythm. Dried fruit-rattles—the *kaniyari danda* of Oraons or, even more primitive, fruit shells tied to the waist—are such musical adjuncts of beginning stages. Later on we have sticks, slit-drums, plates, bars, drums, *veena*-s and flutes. The nonmusical functions of instruments are also a feature of early society. The conch was not only an announcer of battle and victory but also a container of sacred water for ablution (*abhisekha*). The *nagara* and the *dhumsa* were also battle drums ; membranophones have been used as tools for signalling—the most famous ones being from Africa. Rattray, for instance, has shown that the "difference in pitch between two skin-drums used for transmitting news corresponds to the high-and low pitched vowels of ordinary speech". The Savaras of Orissa have a legend where in one Kittung 'invents' a drum and a brass gong to announce a funeral or a wedding.

What then is a musical instrument ? Most broadly put : it is any material used for producing sound in music—but we have already noted its hazy origins. In this sense the oldest instrument is the human body itself, particularly the voice. Indeed, in our musical texts of yore it has been called *gatra veena* : the body *veena*. Clapping of hands, beating on the thighs and buttocks, stamping on the ground—all such auditory bodily actions are the first instruments. It is of interest to note that the hand used as a counting adjunct to *vedic* chanting—no sound is produced at all in this process—is called the *hasta veena* (the hand *veena*). But as usually understood an instrument is a tool, other than the human body, used to produce music. However, closer thought shows that an instrument—at least in the most primitive stage—is but an extension of the body. Just as the spanner is a mechanical device extending the operations of the hand, sticks like the *danda*, and the *kolattam kattai*, clappers like *kartal* and *chipla* are only solid 'projections' of the hand for augmenting the sound. Gradually, this extension of the body gets separated and becomes a musical instrument in its own right.

The nonmusical beginnings of instruments are also worth noting. The scraper, for instance, looks too much like the fire making implement of some tribes, like the Paniyans of Kerala, for the similarity to be accidental. This device is a notched stick held on the ground with another being rubbed along the *serrated* surface. The heat produced by the friction is used for lighting a fire and the fire-producing stick, perhaps, became the scraper used in the music of exorcism. The hunter's bow is another tool which is often regarded as one of the sources of chordophones, the twang of the bow having suggested its employment as an instrument of music. The fact that there are such primitive instruments both in India and Africa, in particular (see *villadi vadyam*), lends credibility to this view. Again the simplest drums are just earthen pots used for cooking and storing grains covered with hide—for example, the *ghumat*, the *tumbaknari*, and the *pabuji ki mate*.

As we survey the history and development of musical instruments throughout the world, it becomes clear that idiophones are the earliest for, as already pointed out, they can be considered as the first tangible extensions of the human body. Also, because of their greater resistance to weathering, they are also the oldest ones archeologically unearthed. Prehistoric remains show, all over the world, rattles, scrapers, bull roarers and bone flutes without holes ; in neolithic strata, some continents have thrown up slit drums, flutes with holes, shell trumpets, the musical bow, and later layers, mainly recent paleolithic, show basket rattles, xylophones, flutes, friction drums and drum sticks.

As with the chronological stratifications, it is equally difficult to determine the geographical origin of an instrument. It is almost impossible to locate, if this can be done at all, the area or areas of the world where the first instrument came from. But it is true that the greater mumber of them can be traced to very old cultures – viz., the Egyptian, the Mesopotamian and the ancient Chinese. And older civilizations of Central Asia could also have given us the early ones ; and as yet the information we have of the contribution of cultures on the Indian peninsula to these sources is insufficient and equivocal. Indeed, Sachs goes to the extent of saying, "In ancient India, as in Egypt there is no instrument for which we can trace a native origin. All of them seem to have come from the west and the north. Strangely enough, we have to wait for the middle ages to find a native stock in Indian music". But then, Sachs did not have the information we have now of our tribal cultures and music.

Nomenclature

When an attempt is made to trace the origins and migrations of instruments, one of the sources of greatest confusion is the name of the instrument ; for very often it is found that the same instrument is called by different names or different instruments are called by same name, even within a large cultural 'unity' like India.

Consider the word *veena*. This term, in Sanskrit and other Indian languages, till recently, seems to have been applied to any instrument except, perhaps, the drums. The *vedic veena*s were harps ; there are the fingerboard plucked ones like the *kinnari veena* ; *ravanhasta veena* was bowed. Among other *veena*s is the *mukha veena*, a wind instrument and a close relative of the *nagasvaram* and the *shehnai*. The hand used for counting the *vedic* notes—where no sound is made at all – is the *hasta veena*. The limit is reached when the Hindi word *been* refers to both the fingerboard chordophone and the snakecharmer's pipe. Thus, the occurrence of the word *veena* is no guarantee of pinning it down to a given type of instrument. However, in current literature the word refers mainly to the plucked fingerboard instrument usually with frets, though there is the *vichitra veena.*

Kinnari is another instance. The related word *kinnorrah* occurring in the Bible was most probably a harp or lyre. But the *kinnari veena* known to medieval India (found today in some parts of South India) was a fretted, fingerboard plucked instrument and the *kinnari,* current even now in Andhra and Mysore, is also bowed. We may note here that the *khingri* (Andhra) and the *kenra* (Orissa) are again bowed instruments.

While studying the migration of Indian culture to Indonesia, the *bheri* was mentioned. Here is a case of interest. Even in the country of its origin, India, the *bheri* is both a large cup-shaped drum as well as a long trumpet ; another instance of multiple nomenclature. But, by the time we reach Indonesia we find it referring neither to a drum nor a trumpet but to a metallic gong. In this case, the *word* has travelled and changed its connotation.

Visual representation

Of the sources of information in organology—besides references in musical texts, general literature, folklore and epigraphic records—sculptures, reliefs and paintings are the most fruitful. Here can be found a direct depiction of instruments and this is of immense importance as the structure, the playing position and the occasion of use and such other details can be easily culled from these.

But here again it is wise to be reserved in relying totally on such evidence. For, how far are these works of art realistic and how far do they draw their own information from contemporary environment ? This is all the more of significance in our country where tradition is so overbearing a force that the respect for it often clouds the perception of immediate surroundings and practices.

The painting and sculpture of India are abstract and symbolic to a large degree. Certainly, no person in his senses will assert or believe that the four-headed God in Hindu pantheon was true to human anatomy. The exquisite beauty of men and women portrayed is in truth the finest abstraction and quintessence of the forms of actual men and women. Realistic representation has rarely interested an Indian artist. This being so, when he sculpts or paints a musical instrument, he is not obliged to give a photographic account of it. On the contrary, its line and form as they contribute to his visual needs may get emphasized at the cost of prosaic details, resulting in a certain degree of distortion. It is not always possible to check this idea with older sculptures, for there is often no corroborating evidence as to the actual construction of instruments. But we may take an example from our times. Here is an 'artistic' drawing of a *sitar*. (Fig. 4. 1.) Compare it with the photograph of the instrument and the distortion is too obvious to require further comment ! Another example is that of the *tamboora*. Invariably all recent paintings, dramas, cinemas make Narada, the mythological bard, carry one such instrument. Having given him the *tamboora*, by a curious sequence of logic, the instrument is seriously believed to be as old as Narada—whatever be the age in which he lived. Yet, it is forgotten that Narada's *veena* was the *mahati*, possibly a psaltery with twentyone strings. (This Narada is mentioned as a Gandharva in *Natya sastra* and *Ramayana*.)

Another problem is the geographical. Just because we come across a particular visual representation or mention in a text of an instrument it is no guarantee that it exists in or around the area where the artist or scholar lived, though we may generally take it to be so. The artist may have heard of it or seen its picture somewhere and used it in his own work as a decoration or a traditional rule. The present author had a very revealing experience. It was an interior village in Orissa, inhabited by the Santal tribe. The hamlet was not very primitive, but on the borderland of 'civilization'. As I wandered round the lanes, right in front of me on a wall was a fine large picture of Sri Tyagaraja, the Karnatak composer, with his *tamboora*. Most certainly the saint and the instrument were unknown to this village in the forest. Being curious, I traced out the artist—a young boy in his teens ; I asked him who this person, he had pictured, was. The lad replied that he did not know, it must be some *baba* (a saint). Where had he seen him ? No, he had not seen the *baba* but had copied from a text book meant for primary education ; unfortunately, the book had been lost. As for wrong mention, often out of ignorance, in a recent research paper by two south Indian scholars, the *sitar* is given as bowed instrument of north India.

Thus the pitfalls in the study of organological history are many and one has to be quite wary. The evidence, unless specific and definite, should form the base of only certain general observations ; the details should be taken with much reservation.

Classification of instruments

This aspect of organology has presented problems peculiar to itself ; for instruments can be grouped on the basis of the material they are made of, the methods of playing, the functional use and so on.

The oldest Indian classification that we know of, and the logical unity of which has not been bettered yet anywhere in the world, was that of Bharata (2nd Century B. C. to 2nd Century A. D.). In his *Natya Sastra* he gives four classes of instruments : *tata*—those which have strings, *avanaddha*—drums, *ghana*—cymbals, *sushira*—flute. *Tata* is derived from the root *tan*—to stretch of tense. That is, these instruments have some form of gut, wire and etc., stretched to produce sound. *Avanaddha* means, to be covered. So, all instruments that have one or two faces covered with hide—drums in general—are *avanaddha*. *Ghana* indicates solid instruments. These do not require any further tuning once they are made ; to this class belong cymbals, castanets, rattles and so on. *Sushira* literally means hollow. All instruments where wind is the producer of sound or the cause of excitement of any other mechanism—flute, *nagasvaram*, *shehnai* etc.—come under this section.

Some seem to have recognized only three categories : *tata*, *vitata*, and *tata-vitata*, though it is not clear what this last implied. Narada (1st Century A. D.) also gives three divisions : *charma* (leather), *tantrika* (stringed) and *ghana* (solid). According to Kohala (prior to 6th Century A. D.) there are four classes : *sushira, ghana*, *charmabaddha* (covered with membrane) and *tantri*. While the classes as given by Bharata have remained the same through the centuries, some appellations have changed. For instance, *anaddha* is substituted for *avanaddha*. Similarly the word *vitata* (without strings) is also used instead of *avanaddha*. Haripala (12th Century, A. D.) in *Sangeeta sudhakara* mentions four types of instruments : *sushira*—flute, etc., *tata*—*veena* etc., *vitata*—*mridanga* etc., *ghana*—cymbals etc.

The Tamil word for instrument—the oldest in Dravidian terminology—as found in the *Sangam* literature of the 2nd to 6th Century A. D. is *karuvi* which literally means a tool and in a musical context an instrument. Five kinds of these were recognized : *torkaruvi*, *tulaikkaruvi*, *narampukkaruvi*, *miatrukkaruvi*, *kanchakkaruvi*. The first class comprised drums—*tole*= hide ; *tulaikkaruvi* is one with holes or a hollow, and hence a wind instrument (*tulai*=hole) ; *narampu* means animal gut and therefore stringed instruments fall into the third category ; *mitatrukkaruvi* is the human voice ; *kanchakkaruvi* is one made of metal—cymbals, for instance. This system is parallel in details to the old Sanskrit grouping : *avanaddha*, *sushira*, *tata*, *gatra* (voice) and *ghana*.

Functionally, three groups were recognized : *geetanuga*—suitable for accompanying singing, *nrityanuga*—suitable for accompanying dancing, and *suska*—solo instruments.

Outside India the Chinese classified their instruments on the basis of the material out of which they were made ; and eight such groups were known : *kin* (metal), *che* (stone), *t'u* (earth), *ko* (skin), *hien* (strings), *p'o* (gourd), *chu* (bamboo) and *mu* (wood).

In the West a reasonable system was first introduced by Mahillon only in 1880 A. D. and this arrives, after devious other taxonomies, to the ancient Indian one. Mahillon gives four classes : autophone (*ghana*), membranophone (*avanaddha*), chordophone (*tata*) and aerophone (*sushira*). This scheme was slightly altered by Hornbostel and Sachs. One of the changes was that the term 'autophone' was replaced by 'idiophone'. The basic idea was further worked out in detail and they used the Dewey method of numbering and classification—a system usually employed by book libraries. Theirs is the schedule now made use of in all countries and, as already indicated, is the same as the one developed in our musicology nearly two thousand years ago. While this is the first stage and the foundation, it is possible and necessary to go into greater details. For instance, Nicholas Bessaraboff, basing himself of the work of Francis Galpin, gives the following table (summary given here) :

CLASS I. IDIOPHONES

Division 1. Instruments controlled directly
  Section (A). Rhythmic (unpitched)—cymbals, etc.
  Section (B). Tonal (definite pitch)—bells
Division 2. Instruments controlled by keyboard
Division 3. Instruments controlled by automatic motion

CLASS II. MEMBRANOPHONES

Division 1. Instruments controlled directly.
  Section (A). Rhythmic—tabor, side drum
  Section (B). Tonal—kettle drum
Division 2. Instruments controlled by keyboard
Division 3. Instruments controlled by automatic motion

CLASS III. AEROPHONES

Section (A). Flue-blown
  Subsection (a). Air-stream directed by lips
    Group 1. Vertically blown
    Group 2. Transversely blown
  Subsection (b). Mouth-piece blown

Section (B). Reed-vibrated
Subsection (a) Reeds controlled *indirectly*
Group 1. Single beating reed
Group 2. Double beating reed
Group 3. Polyphonic reeds
Group 4. Free reed
Subsection (b) Reeds controlled *directly*
Group 1. Single reed
Group 2. Double reed
Section (C) Lip vibrated
Division 1. Instruments controlled by keyboard
Section (A) Flue and reed pipes
Section (B) Free reed
Division 2. Instruments controlled by automatic motion
Division 3. Free air instruments

CLASS IV. CHORDOPHONES

Division 1. Instruments controlled directly
Section (A) Plucked
Subsection (a) Without neck
Subsection (b) With neck
Section (B) Struck strings
Section (C) Bowed strings
Subsection (a) Without fingerboard
Subsection (b) With fingerboard
Division 2. Instruments controlled by keyboard
Section (A) Plucked keyboard
Section (B) Struck keyboard
Section (C) Bowed keyboard

CLASS V. ELECTROPHONES

A simpler scheme is given in the *Encyclopaedia Britannica*, 1962. (Summary given here.)

IDIOPHONES

	Wood or other organic material	Metal or inorganic

Struck	xylophone, slit-drum	triangle, bells, gongs
Struck together	rhythmic sticks, castanets	cymbals
Shaken	rattles	jingle bells
Scraped	ratchet rattles, *guiro*	wash board
Rubbed	rubbed wood	glass harmonica
Plucked	Jew's harp	Jew's harp. African *sansa*, etc.

MEMBRANOPHONES

Struck	drums : *bowl drums* – pottery drums, tympani ; *tubular drums* – side, bass, tabor, *bongo* ; *frame drums*—tambourine "*Rolle*" (a leather cylinder —China)
Shaken	rattle drums (Tibet)
Rubbed	friction drums
Plucked	Indian *gobi yantra*

CHORDOPHONES

Ground harp (rattan rope) : beaten

Musical bows : Plucked. beaten or, (in hottentot *gura*) blown.

Zithers (strings run from end to end of resonator) : *open strings* : plucked—psaltery, harpsichord ; beaten—dulcimer, pianoforte ; wlnd blown—aeolean harp

stopped strings ; plucked—Austrian zither, mountain dulcimer ; bowed—bowed zither

Lyres (strings run over resonator to cross bar) :	plucked – ancient and African lyres ; bowed – Welsh *crwth*
Lutes (strings run over resonator and along 'neck' where they may be stopped) :	plucked—lute, guitar bowed—violin bowed by wheel hurdy-gurdy
Harps (strings leave resonator at an angle in a plane vertical to sound board) :	plucked—*acute angular frame* : ancient and non-Western harps ; *with neck and bridge* — African harp-lute

AEROPHONES

Flutes (no mechanical vibrator) :	*artificial air slit*—(tubular) whistles, flageolet, recorder ; (globular) bird whistles ocarina, lip-formed air-slits (tubular) side blown, transverse flutes ; end blown—*kaval*, panpipes, notched flute ; (globular) gourd flutes
Trumpets (vibrating lips coupled to air column) :	Conch, animal horn, tusk, wood (alpen horn) : end blown or side blown ; with finger holes—cornet, serpent. *Metal* : mainly cylindrical bore—trumpet, trombone ; narrow taper bore—french horn, posthorn, cornet ; wide taper bore—bugle, tubas.

Reed instruments : *cylindrical bore* : single reed—clarionet; double reed—aulos, crum horn ; free reed—free reed pipe of Central South Asia.
taper bore : single reed – saxophone ; double reed – shawm, oboe.

Free aerophones : *without reed*—bull roarer, siren ;
band reed—grass squeakers,
free reed - bark or fish scale placed in mouth, mouth-organs, accordion, toy trumpets

The two classifications of Western organologists, just detailed, do not naturally apply *in toto* to our instruments. For instance, key board instruments—except the harmonium—are not yet Indian ; again, it may be more useful to classify our drums in a different manner. However, in a recent compilation on the folk musical instruments of this land, a schedule, based obviously on that of Bessaraboff, has been given as below :

CLASS I. GHANA VADYA (Idiophones).

Division 1. Striking.
  Sub Division A. Clashed
  Sub Division B. Struck
  Sub Division C. Shaken

Division 2. Plucking.
  Sub Division A. With finger
  Sub Division B. With ratchet

CLASS II. AVANADDHA VADYA (Membranophones)

Division 1. Striking
  Sub Division A. *Damaru* shaped (hour glass)

Sub Division B. *Khanjari* shaped (rim type)
Sub Division C. *Ghat* shaped (pitcher type)
Sub Division D. *Nagara* type (bowl)
Sub Division E. *Dhol* type (cylindrical)

Division 2. Plucking.
Division 3. Friction

CLASS III. SUSHIRA VADYA (Aerophones)

Division 1. Lip voiced
  Sub Division A. *Singha* type (horn shaped)
  Sub Division B. *Turhi* type (trumpets)

Division 2. Flue voiced
  Sub Division A. End blown
  Sub Division B. Vertical
  Sub Division C. Transverse

Division 3. Reed voiced.
  Sub Division A. Free reed
  Sub Division B. Single beating reed
  Sub Division C. Double beating reed

CLASS IV. TATA VADYA (Chordophones)

Division 1. Bowing
  Sub Division A. Without frets
  Sub Division B. With frets

Division 2. Plucking
  Sub Division A. Open Strings
  Sub Division B. With frets
  Sub Division C. Without frets

The above has been developed in relation to Indian folk and tribal instruments but has to be more comprehensive, as for instance, to include beaten 'strings'; and a system to include tribal, folk and concert instrument both of the past and present is a desideratum.

While, all the classifications described so far are more or less musical in purpose, taking into account the structure and methods of playing, it is also necessary to consider the acoustic properties of instruments. A method based only on this is also available :

A. String instruments.

1. Plucked strings
2. Bowed strings
3. Struck strings

B. Wind instruments

1. Air reed (all kinds of flutes)
2. Single mechanical reed
3. Double mechanical reed
4. Combination of air and mechanical reeds
5. Lip reed
6. Vocal chord

C. Percussion instruments

1. Definite pitch
2. Indefinite pitch

D. Electrical instruments

Considering all these systems and coming down to bare essentials, it is obvious that there are mostly two classes of instruments in use :

1. those where the vibrating material is mainly solid
2. those where the vibrating material is mainly gas (air)

Those using a liquid (water), like the *jalatarang*, are indeed rare and even here it is the cup that is the main vibrator.

It is therefore proposed here to continue the traditional Indian taxonomy of *ghana*, *avanaddha*, *sushira* and *tata*. The depth classification will generally be based on acoustic principles, construction and methods of playing. Naturally, there will be border line cases of ambiguity ; further, the subject will be described to include only 'Indian' instruments.

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CHAPTER V

GHANA VADYA (IDIOPHONES)

The earliest instruments we know of are the idiophones (*ghana vadya*). These do not require any special kind of tuning and can be played as they are made. Ethno-organologically also it is reasonable to treat them as the most primitive, for they do not need any advanced techniques of tooling. Indeed any two pieces of solid struck or rubbed together can become an idiophone.

As mentioned earlier, the simplest of such instruments can be considered as an extension of the hand. The 'original' instrument is, of course, the human body itself. Stamping on the ground, clapping of the hands or striking the buttocks with the hands are natural acts of rhythm. The weird sound of '*hulu robo*'—shaking the forefinger in the mouth while shouting—of Bengal is a modified vocal sound, using the finger as an implement of modulation. The voice is the God-given *veena*—*daivi veena*. The amplification and emphasis of such acts give us the various rods, pots and plates used for rhythm.

The older an instrument (historically), the closer is it associated with the daily life of man. Specialization and weaning away from other material culture to musical uses is a later stage. For instance, one of the primitive implements of fire-making is too like a scraper for it to be an accidental coincidence. The *danda* is perhaps a more peaceful use of the hunting rod and the sword. The *ghatam* and the *noot* are cooking pots serving musical purposes.

Man in the most primitive stage employed material readily available to him for fashioning musical instruments. Animal and human bone, horns, mollusc and tortoise shells, parts of a tree were all so deployed : by rubbing, beating, rattling.

Another way of producing an instrument was, for example, to fell a tree and scoop out the trunk, leaving a longitudinal

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slit at the top. This is generally called a slit drum—a misnomer, for, obviously, it is no drum at all. The instrument is beaten with sticks, sometimes it is kept on a pit and jumped upon, as has been found among the Uitoto Indians (of America) in South America and Africa. This is known in India with some of the Naga tribes of Assam. In all these cases, it is employed both for signalling and in community dancing.

By the very nature of their construction, the sound emitted by most idiophones is noisy. That is, they do not give out a sound of definite pitch ; also the sound so produced is of indefinite quality and of short duration. Hence these instruments are eminently suited for rhythmic purposes. Idiophones, because of their structure are also the earliest, for any substance can become such an instrument ; further, due to their acoustic properties they have also remained comparatively ill-developed.

The idiophones commonly known in India may be classified as in the scheme below :

I. IDIOPHONES

1. BELLS

A. *Struck*
  i. Indefinite pitch
  ii. Definite pitch

B. *Shaken*
  i. Indefinite pitch
  ii. Definite pitch

C. *Rubbed*

2. POTS

3. PLATES

A. *Clashed*

B. *Struck*
  i. Indefinite pitch
  ii. Definite pitch

C. *Shaken*

4. RODS, RINGS, etc.
   - A. *Clashed*
   - B. *Struck*
     - i. Indefinite pitch
     - ii. Definite pitch
   - C. *Plucked*
   - D. *Shaken*
   - E. *Rubbed*

I. 1. BELLS

I. 1.A. *Struck bells* (*ghanta*—Hindi, Marathi ; *maṇi*—Tamil ; *ganta*—Telugu, *gante*—Kannada).

(i) The commonest bells we come across are those of indefinite pitch and are struck. They have not been 'musical' instruments to any significant extent, but have remained parts of the paraphernalia for worship in homes and temples. Such worship can be anything from the exorcism of devil dancers to the quieter rituals of priests. As one enters a Hindu temple a row of suspended bells of varying sizes and shapes attract one's attention ; and it is a sign of devotion to first ring them and then enter the sanctum. There are, of course, the bell of justice (*araichi maṇi*—Tamil), and the bell of victory (*jaya ghanṭa*) as well as the cow bells.

The word struck has been employed to cover also the act of striking a bell with a tongue or clapper suspended inside the bell. This 'striking' is really achieved by shaking the instrument ; it is possible therefore to dispute the inclusion of these bells in the struck class. However, the real action of producing the sound is by striking the body of the bell — though by shaking and hence even those bells which are shaken have been included here. Though they are less common, bells which are struck on the outside, usually with a wooden stick, are also known.

Apart from any musical limitations, the main reason for the limited application of these instruments in music is the difficulty of making, casting, tuneful ones. The exactitude in pitch required is almost impossible to achieve. Also the manipulation of bells for musical purposes is certainly not easy and the results not satisfactory. Because of the shape and the difficulty of casting, the sound is more 'noisy' than 'musical', the pitch of the bell depending on its size, weight and the point of striking. The tone and the volume of sound can, however, be varied by controlling the place of percussion, the material with which the bell is struck and the force of the blow.

In the West a set of bells – often manipulated with a keyboard – is used in music and goes by the name of glockenspiel or carillon.

Bells are generally made of bronze which is, hence, called bell metal. The alloy is of copper (76% to 80%) and tin (24% to 30%). But even wooden bells with tongues can be seen in rural areas where they are tied round the necks of cattle (Fig 5.1).

(ii) The only important idiophone of this class with a definite pitch is the *jaltaranga* (*jal*=water, *tarang*=wave or set of tones; of. *tabla taranga*, *kastha taranga* and so on) (Fig. 5 2).

The instrument comprises a set of porcelain bowls of varying sizes, each filled with water to more or less amounts. By choosing the sizes and by adjusting the quantity of water in the cups the player can tune them. The number of vessels naturally depends on the number of notes in the *raga* as well as the range the musician is interested in. The cups are arranged in a semi-circle; the musician sits at the centre of this half-circle and beats the water-filled vessels with small, thin bamboo sticks—one in each hand. Since the notes given out are staccato, the instrument cannot give the finer pitch variations (*sruti*-s) and graces (*gamaka*).

This type of instrument is referred to in ancient Byzantine literature (9th Century) and a metal '*jaltaranga*' is depicted in a Greek manuscript of the fourth century A. D. While it is known in Malaysia, and Chinese sources take it to the 10th century. A. D., in our own country there does not seem to be any definite early mention. It is said that Alexander, the Greek, took along with him from India some musicians amongst whom were a few *jalaranga* players. However, Vatsyayana in his *Kamasutra* (3rd Century A. D.) mentions an *udaka vadya* (water instrument) which some interpret as the *jaltaranga*; for this there really is no warrant.* But a reference occurs in Ahobala's *Sangeeta parijata* (17th Century).

I. 1.B. *Shaken bells*

(i) It is probable that Shaken bells are prior to the struck ones, for it is reasonable to trace the beginnings of all kinds of bells and instruments of similar nature to dried fruit and shells. Hollow desiccated nuts, fruit and gourd rattling in the wind and making noise could have suggested to forest dwellers the use of these things for rhythm in dance. The rhythmic sound so provided is indefinite and so is the quality of sound; yet such fruit and shells are easy to obtain.

A small calabash, after being dried, when shaken gives a hazy rhythm. A variation of this is, for instance, the *jhumra* of Orissa which is rattled with handle, made of a cocoanut shell containing pellets or seeds. Instruments and toys of this kind are known throughout India : *jhunjhuni* (Bengali), *khunkhuna* (Hindi), *khulkhula* (Marathi), *gilki* (Kannada) and so on.

Instead of employing one fruit a better effect is obtained if a set of small dried beans are bound together. Such garlands are often tied as girdles or anklets by tribal dancers. The *gilabada* is one such waist-belt, found among the Chenchus of Andhra. The Oraons of Orissa have an instrument called the *kaniyari danda*. It is a long bamboo pole onto which are tied hundreds of dried *champa* or *kaniyari* fruit. The stick is held vertically and is shaken or beaten on the ground while dancing (Fig. 5.3).

A later stage comes when the calabash or seed rattle is imitated in bamboo basketry, clay, wood, metal and, in recent times, chemical plastics. Early developments of this can be

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seen, for example, in the belts of bells worn by the Maria tribe of Madhya Pradesh; and, of course, the ankle bells.

Ankle bells (*gunghuroo*—Hindi, Marathi; *gejjai*—Tamil; *gejjalu*—Telugu; *gejje*—Kannada) are of various shapes: more or less spherical with a free moving ball of metal inside (Fig. 5.4). The body, more often than not, resembles a closed bud, the leaves of the bud being slightly separated. The material of construction is brass, though ornamental bells are made of silver. More than the 'musician' it is the 'dancer' for whom it is indispensable; indeed, to a dancer in India the ankle bell is almost a totem; and to tie them on ceremoniously is a sign of entry into the profession. Also as decorative waist bands, small bell-lets garlanded are known as *kinkini jala*, *khudra ghantika*, *noopur* and so on.

A modification of this principle of bell is not to make a spherical or conical shell or body but a hollow ring. The ring—of brass or bronze—may be completely closed or slit on one side. A few pellets are put into it; the ring is, of course, not necessarily circular. The instrument is known as the *silambu*, in Tamil Nadu. When worn on the ankle it is called *kar-chilambu* (*kal*=leg) and when on the wrist, *kaichilambu* (*kai*=hand) (Fig. 5.5). Often, as in the folk song and dance—*kaichilambu pattu*—the instrument is just held with the hand inserted into it and is moved in a rotatory manner to give the required rhythm. In other parts of south India, as in Mysore, it is known as the *gaggara*, whereas north India knows it is *painjan* (*painjani*) or *noopur* (Fig. 5.6).

(ii) As discussed earlier, the various types of shaken bells are indefinite in pitch and have therefore not been put to melodic uses. But an uncommon, though not very successful, melodic instrument of this kind is the *ghungroo tarang*. A line of *ghungroo*-s is stitched onto a leather strap, the bells being of fairly same pitch. The belt when shaken or jerked gives an approximately uniform pitch. A series of such straps—one each for one note of the *raga*—is suspended from a cross bar of a vertical frame. The present author has heard tunes and even what could pass as *raga*-s on a *ghungroo tarang*. It was, however, an instrument more suited for dramatic 'effects' and perhaps can be used in group music.

C.I. Rubbed bells are indeed very rare and only one specimen has been noticed by the writer. It was a bell of heavy bronze, about 25 cm in total height, and had a wooden handle. By rubbing a polished wooden stick on the rim of the bell a fine continuous sound could be produced. I have, however, not been able to find out for what purpose it was used, except that it was part of a temple ensemble.

This process of sound production reminds one of the glass harmonica of the West. This was a set of wet glass bells which were "set into vibration by pressing on them with the finger"—that is, by moving the finger on the wet rim of the tumbler. As early as 1746 Gluck played a concerto on this and later on even Mozart and Beethoven composed music for it.

I.2. POTS (*Bhanda Vadya*)

It is obvious that pots originally served the purpose of fetching water, storing grains, cooking and such other domestic chores and only later did they acquire a musical function, more in tribal and folk music than in the concert.

Known as the *noot* in Kashmir and the *matki* in Rajasthan, for instance, as more or less a folk instrument, it finds a place from simple rustic accompaniment in the plains to the more sophisticated *rouf* of Kashmir. An ordinary pot of burnt clay is placed on the lap of the squatting player or on the ground, one hand striking the body and the other the mouth of the vessel. The *gagri* or *gagra* is sometimes met with in north India. It is used exactly like the *noot* or *matki*, but is made of brass or copper. Often metal rings are worn on the fingers and the thumb for effective sounding (Fig. 5.7).

The south Indian *ghatam* has become a highly sophisticated instrument, raised to a concert status; The clay chosen for making the pitcher is of a special type and the instrument itself has to be carefully shaped and fired in the kiln. Besides its superior quality as compared to the *noot*, the mode of playing is also very different. The *ghatam* player sits cross legged on the floor, with the mouth of the pot pressed onto his uncovered belly. The body of the instrument is struck at various places with fingers and palms, but never on its mouth. The player also presses the mouth of the *ghatam* onto his abdomen to various degrees, producing fine tonal differences. In the hands of an accomplished musician this innocuous pot can become a beautiful rhythmic accompaniment (Fig. 5.8).

I. 3. PLATES

A. Clashing is the process wherein two similar objects, with flat parts, are brought together face to face. It is rare, except in the cases of well made cymbals, to find instruments of definite pitch in this class ; the majority are indefinite in tone and do not lend themselves to melodic construction, thus being mainly rhythmic in purpose.

One of the simplest instruments of the clashed type is the *chekkalu* (singular, *chekka* : Telugu), *chittike* (Kannada) or the *rai* (*ram*) *gidgidi* (Hindi-Brij) ; this is sometimes called the *kartala* in South India. A pair of circular plates (of about fifteen centimeter diameter) made of hard wood, continuing into a handle each, forms the instrument. The pieces are held in one hand such that the index finger is inserted between them ; one of the discs is struck onto the other with the base of the palm of the other hand. An even more primitive specimens, often seen in the hands of beggars, is a pair of flat stones used exactly like the *chekkalu*. A variation is that, instead circular plates, oblong ones (*chekkai*—Tamil Nadu) are employed (Fig. 5.9).

While the flat plates like the above are certainly indefinite in pitch, cymbals can be made and turned to such a fine degree that they do acquire a recognizable pitch. However, since they are rarely, if at all, instruments for melody they are here included with the plates. Indeed most of the cymbals we know of are rhythmic instruments without any strictly ascribable tonal value. Cymbals are musically definable as a pair of large or small concave bell-metal or brass 'plates'. The two sections, similar in all respects, are clashed against each other. The collision may be face to face or rim to rim (tinkling), either vertically or horizontally.

In shape they fall somewhere between a full cup (bells, etc.) and plain plates. Though they can be said to be roughly 'concave', the actual shapes are many. The simplest is just concave without any noticeable flat rim. Others have narrow or wide rims with a central deep concavity, the boss. Deep cup-shaped cymbals are also known. Further, the two parts may be tied together by means of string or held separately. In either case, there is hole in the centre of the cymbals through which the thread passes.

The general term for such idiophones is *tal* or *talam*. This is obviously related to the word and act of rhythm. Often, even the word *kartal* is employed. Indeed, any two pieces held in the hands and clashed become a *kartal*. The present author has seen in an interior village of Orissa a tribal using the bases of oil drums as a *kartal* and even calling them so. The regional varieties are also many and so are the names.

The instrument is not used in concert music, except perhaps with the *nagasvaram*, but is an invariable rhythmic accompaniment to devotional music—*bhajan*, *abhang*, *devarnama*, as well as in some forms of dance. In dance the *nattuvanar* or the dance 'conductor' employs it as his principal rhythm keeper. But the virtuosity sometimes exhibited is really staggering. For instance, the *kamsale* dancers of Mysore form groups of two men, each person holding a pair of small *tala*-s. Dancing with exhuberance, they clash the cymbals producing rhythmic patterns of great beauty. Equally attractive is the *tera tali* of Rajasthan. A woman squats on the ground with sets of *marjeera*-s tied to her legs ; with a pair of them in her hands she plays on the others, creating fine music. This was known to Abul Fazl who describes it as *sezdah tali*.

While the cymbal is said to have travelled to China from

India, it certainly was taken from here to the Indonesian islands where the word *tala* is also current. The earliest evidence for the existence of this instrument in India comes from the Indus valley. Sachs, however, is skeptic about this and is of the opinion that they might have been lids of vessels. *Aghati* is one of the oldest names for cymbals and occurs both in the *Rigveda* and the *Atharvaveda*. While it is generally accepted that *aghati* or *aghata* referred to cymbals, there are some differences of opinion. Macdonell, Keith, Whitney, Raghavan and others consider the word to signify such idiophones ; but Sachs remarks that "its translations as clappers or drums are merely a guess". However, Sayana identifies it as a kind of stringed instrument and gives its alternative names as *ghatilaka* and *kandaveena*. This much we know that it was a musical instrument used for accompanying dances. Another later reference is from the *Natya Sastra*, wherein Bharata refers to *Kansya talika* and *jhallari*.

The larger sized cymbals go under various names like : *brihattala*, *brahmatala* and so on (*brihat*, *brahma*=large or enormous). Similarly, the Assamese *bortal* is a big bronze cymbal slightly thin, but with a large boss. Indeed, these *brihattala*-s may have a diameter anywhere from 15 to 30 cm. They are also called *jhanj* or *jhallari* (*jhallara*) in some parts of North India and the corresponding word in South India is *jalra*. Also there is an old Tamil word, *callikai*, which seems to be related to *jhallaka* and *jhallaki*. The smaller variety (about 7 cm. in diameter) comprises the *manjeera* or *tal* (North India) and *tala* or *kanjam* (South India, cf Sanskrit *kansya*) Other types are the *elattalam* and *kuzhittalam* from Kerala ; both are of bronze, about 12 cm. diameter and half a centimeter in thickness—the former is more or less flat and the latter has a deep boss (*kuzhi*=depression) (Figs. 5.10, 5.11, 5.12).

The *tchechka* and *thiski* (*thiska*) are rhythm keepers found among the tribes of Bihar and Madhya Pradesh. The *modus operandi* is simple: an oblong wooden plate moving along a wire frame strikes against a set of circular discs. Two varieties are commonly met with ; the two-disced and the four-disced. In the former, a thick metal wire is bent in the form of an inverted U (∩) and the legs bear the platelets, one on each. A longish wooden plate is moved up and down the wire frame and clashed onto the fixed plates. In the case of the four-disced *thiska*, there is a cross of oblong wooden strips striking the discs (Fig. 5.13).

B. *Struck Plates*

(i) Of the struck kind without any definite pitch we come across many, though not necessarily of any great variety. In these, as well as those with a definite pitch, a plate of metal is beaten with a rod, a mallet or the hand ; that is, the two parts of the instrument are not the same in shape and/or quality.

The commonest is a bronze plate struck with a wooden rod, which may be a plain stick or hammer-shaped, and is used in tribal and folk music. The metal disc has usually a diameter of 20 cm. A general practice is to convert the plate used for eating food, as and when the occasion arises, into a musical instrument : hence the name *thali* for the instrument in the northern areas of the country (*thali*=plate, dish). That is also why it is often found that these *thali*-s have raised rims. The methods of playing also vary. The plate may be held in one hand and beaten with a stick in the other ; both the *thali* and the rod may be held in the same hand. Particularly when the instrument has raised edges, it is kept inverted on the ground and beaten either with one or two sticks or with the hands. Naturally the names differ according to the region and language : *chenkala* or *chennala* (Malayalam), *semmankalam* (Tamil), *jagte* or *jagante* (Kannada), *thali* (Hindi), *ghadiyal* (Rajasthani) and so on (Figs. 5.12, 5.14).

While the plates generally seen are of fairly uniform thickness the *ghanto* (Orissa) and *kansi* (Bengal), for instance, are thicker in the centre than at the periphery, thus capable of giving out different tones. The *seemu* of Manipur is a big gong, about 50 cm. across, with a raised edge and a small boss in the centre. It is held by a loop of chord attached to the elevated rim and struck with a cotton-padded stick (Fig. 5.15).

Though the gongs are used commonly for ritual purposes and in non-concert music, they are also signalling instruments—usually to indicate the time or watch of the day—hence the name *ghanta* and *ghadiyal*. Indeed, "to beat the *jagante*" in Kannada is "to blow one's trumpet".

An interesting fact is the migration of the instrument and its name to Indonesia. Words like *genta* (India=*ghanta*, *ghante*, etc.) and *kangsi* (Sanskrit *kansya*=bronze) refer to bells, gongs, plates as in India. But the Balinese gong is there called *bheri* which, in our country, means a large conical drum or, sometimes, a trumpet. Here is a case of a *word* migrating and being applied to a different *class* of instrument.

(ii) There are not many idiophones of this type : plates of definite pitch, useful for melodic purposes. One such instrument, however, is the *sreemandal* of Rajasthan, a set twelve metal discs each of different pitch suspended from a frame. The note emitted by a plate, of course, depends, on its thickness and diameter. The former is more or less the same for all the discs, but the diameters vary from ·12 to 20 cm., the whole instrument being about 150 cm. high. They are all made of brass or cast iron, and beaten with pair of wooden hammers. The *sreemandal* is used in festivities and is a folk instrument in its native region. Curiously enough, a very similar gong chime, called the *yun lo*, is found in China and is said to have gone there from Mongolia (Fig. 5.16).

I. 3.C. Shaken plates. The best known shaken plates are the *chimta*, of Punjab and Haryana, or the *chimpia* of Rajasthan and the *lezim* of Maharashtra.

The *chimta* is a pair of tongs to which are attached shaking platelets ; as a matter of fact, *chimta* literally means tongs. The length of the instrument is about a meter or less. The arms of the tongs, made of steel, are thin and flat, tapering towards the free end. On the outer side of these flat arms are fixed a number of brass plates by means of screws and nuts or even rivetted. However, enough leeway is left so that on shaking or clashing they jingle and produce a pleasant sound. The *chimta* is used for rhythmic purposes in folk music and dance (Fig. 5.17).

The *lezim*, again, is an instrument of rhythm, employed in dances, processions and mass drills. The instrument consists of a wooden rod or handle about half a meter in length. A loose chord of cotton is tied connecting both ends of the stick. This chord bears a number of iron platelets arranged in pairs. Holding the wooden bar in one hand, the player jerks the rope to give a jingle of sounds. When a group of dancers perform the *lezim* it is indeed a thrilling experience to witness the massive coordinated rhythm (·Fig. 5.18).

I. 4. RODS AND RINGS

A. A very common type of clashed sticks are the *kartal*-s : the wooden clappers. Known by various names (*chiplya*—Marathi, *chipla kattai*—Tamil, *bhajana chikkalu*—Telugu, *chatkula*—in Madhya Pradesh), the *kartal* has various shapes and sizes : oblong, elliptical, fish shaped and so on. Usually made of wood, but sometimes of stone, metal and even ivory, the instrument consists of a pair of clappers, about 15 cm. in length, the clashing faces being flat. There is provision for the thumb and fingers which hold the *kartal*. There are also small bells or plates on the *kartal*, to give better rhythmic effect. The instrument is specially used by devotees and the *harikatha* (religious discourse) performers for accompanying their singing (Fig. 5.19).

Even more primitive is the *tokka* of Assam. It is a bamboo tube, 30 to 90 cm. length slit lengthwise. The lower end is cut out to make a kind of handle. It is held in one hand and beaten against the palm of the other or the tube is merely shaken, the slit faces rattling against each other. Though it is a musical instrument now, I suspect that its origin might have been in animal hunt, specially of elephant. Even now, a small bamboo clapper, identical with the *tokka*, is a noise maker in the *khedda* (elephant hunt) operations in Mysore. A large group of men encircle the possible sites of the animals, each sounding the clapper loudly. The frightened game come together, with the hunters' circle becoming smaller and smaller, and finally get caught in special traps. I am not sure whether the *tokka* is employed for similar purposes, but the preponderance of elephants in Mysore and Assam is suggestive (Fig. 5.20).

B. Struck rods and rings

By struck instruments are meant those where the parts coming into contact to produce the sound are usually, though not necessarily, similar and the area of contact is small. In clashed idiophones, the parts which make the impact are similar in structure and the surface of contact is generally flat and larger in extent.

(i) Of the earliest implements used as musical instruments is the slit drum, though strictly speaking, it is not a drum—i.e., a hollow body covered with skin. In its oldest stage, it consists of a hollow tree trunk kept on a pit and stamped upon. A more developed form is a log which is scooped out leaving a longitudinal narrow slit at the top, and beaten by men with sticks. These slit drums have been noticed among the Ao Nagas of Assam, who call it *songkong*, *tongten* or *sheku*. Originally used in rituals among the older tribes of the world, it has become a signalling tool at later stages, as it is so now among the Nagas. The instrument is about eleven meters long and four meters in circumference and forms a part of the paraphernalia of the *moorung* or men's dormitory-cum-skull house, where young unmarried men spend their nights. One or two of them keep guard and on suspicion of any danger the *songkong* is loudly beaten and the village prepares for the emergency. "The kind of tree referred to is, of itself, when scooped out, capable of producing a tremendous noise, and is on certain occasions used as a musical instrument." A portable, bell-shaped, version of this is perhaps the *katola* of Madhya Pradesh.

The *villu* (*villu kottu*, *ona villu*) is an idiophone peculiar to Kerala. *Villu* means a bow ; and the instrument is shaped like one. The bent part of the bow is a spathe of cocoanut or arecanut palm. The ends of this bear small slits into which is inserted a thin bamboo rod, replacing the bowstring. This cross bar is struck with another bamboo stick. The resemblance to bow and arrow is veryclose and it is only too obvious to derive the *villu* from the hunter's bow. *Villu* literally means a bow, *kottu* is to beat, and *Onam* is a festival. Since it is a struck bow, it must have been named the *villu kottu* and as it is used in *Onam* festive dances and music it is also known as the *ona villu*. No melody but only rhythm is played on it (Fig. 5.21).

The most ubiquitous instrument is a pair of sticks—rough, lathed, polished or decorated, with or without jingles—used in folk music and dance, and the words referring to them mean just that : *danda* or *dandi* (all North Indian languages', *kolu* (Kannada, Tamil) *karra* or *katta* (Telugu). The best known association of *danda* with dance is the *dandia ras* of Gujerat—a dance (*ras*) of sticks (*dandia*). *Kolattam* (*kolu*=stick, *attam*= dance) is again a fine group dance of South India, particularly the variety called *pinnal kolattam*. Here a prearranged number of persons, usually girls and women, dance, each with a *kolu* in a hand, and holding a rope or tape suspended from the ceiling : all the tapes are attached to the same point at the top but are free at the lower ends which are held by the dancers. As the women move about in definite design and rhythm, beating the *kolu* and singing, the ropes get plaited (*pinnal*) into a beautiful design. The dance goes on to de-plait the ropes, the choreography progressing on well conceived geometrical designs (Fig. 5.22).

(ii) Instruments made of rods and rings and having definite pitches are not common. Because of the necessities of music—the sharpness of tuning, tonal graces and so on—which

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they cannot meet, idiophones of this category have remained unimportant. Our music requires notes of some duration with potentialities for fine *gamaka*-s ; accurate tuning is also essential for refined music. Idiophones, in general, can rarely satisfy these conditions and have therefore been more or less confined to rhythmic purposes.

The *kashtha tarang* (xylophone) is one instrument which, to some degree, has been in use, though it is found more commonly in various other non-European countries. The most primitive form, as seen in Africa, is where the player, usually a woman, sits on the ground with outstretched legs with a few slabs of wood or even stone across them. The slabs are beaten with a stick. The next stage comes when such planks are laid on logs, sometimes with a pit under them acting as a resonator. Later on cut gourds are attached to the bars of wood, as in the *marimba* of the Bantu negros. Such instruments are met with widely in South East Asia also, where a set of bamboo tubes—each of a different size—forms the xylophone. In spite of the long ethnic relations between India, Africa and South East Asia, we do not find these instruments here and the *kashtha tarang* does not seem to have been referred to in any of our texts. The modern instrument is set of oblong wooden plates (or rods) of wood (*kashtha*) of diffrent sizes, fixed in row onto a metal frame. These plates produce different notes of the scale when struck with wooden hammers. When metal tubes or glass slabs replace the wooden bars, the instrument becomes *nal tarang* or *kanch tarang*. Such instruments are rare and are more curios than regular parts of even an ensemble ; they are seen neither in our folk nor tribal music.

A class of great interest, though not always musically but at least architecturally, are the lithophones : those instruments made of stone. The use of this material for making instruments is an ancient practice : indeed, in primitive music it is not uncommon. Stones tuned to various pitches are known in Venezuela, Ethiopia, Chios (Mediterranean Island), West Polynesia, Korea, Amman and China. In the last named country, a

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whole set of L-shaped stones finely tuned to various pitches is suspended on a frame and struck somewhat like the *sreemandal.* This stone chime called the *ching* or *pien ching* was once highly valued. It is said of Confucius that, "the master was playing one day, a musical stone in Wei, when a man, carrying a straw basket, passed the door of the house where Confucius was, and said, 'This heart is full that so beats the musical stone' ".

In our own country musical pillars have been known for long. As per data are now available, these are confined to South India and the reason is, most probably, geographical and geological. The stone in the Deccan plateau s hard (basalt and granite) and has enough elasticity to be capable of producing musically acceptable sounds. Other parts of India are more or less alluvial and the stone there is much less cohesive and crystalline. This is also perhaps related to the great skill and beauty developed in architecture, sculpture, and icon production in the southern areas. The best examples of such musical pillars are from Hampi (15th Century), Suchindram (18th Century) and Madurai (17th Century) temples. They are often found in many *mantapa*-s (halls) in temples and it is surmised that could have been parts of ensembles accompanying dance. The pillars are of various types, ranging from 90 to 180 cm. height ; usually carved out of one boulder, small pillarets form integral parts of a larger pillar, and the whole piece goes beautifully with the rest of the architectural design. Particularly interesting is the pillar at the Devimantapam in the temple at Tadpatri, Andhra. The lithophonic column has a constriction at one-third · its length ; the two sections thus partly separated have a ratio of 1 : 2 in length and an octave relation in pitch. Various scales have been attributed to these pillars—*rigvedic* (*udatta, anudatta, svarita*), *Kharaharapriya, Harikambhoji* and *Sankarabharanam.* Actual listening has been unconvincing ; however, more systematic acoustic investigations have been undertaken by some physicists recently (Fig. 5 23).

C. Plucked idiophones

A small but widely distributed plucked idiophone is the *moorsing* or *moorchang*. While confined to tribal and folk music in the rest of India, it can be heard on the concert platform in the south. Basically, the instrument is derivable from a reed fixed at one end and free at the other. The simplest type is made of bamboo, as for instance the *gagana* (or *gonginna*) of the Assam Garos. This consists of a thin frame of about 20 cm. length in the centre of which is a free reed, fixed at one end. The *moorsing*, however, is made of iron. The frame is circular, the circle being incomplete and projecting into a pair of tapering prongs. Attached to the circular body and jutting out between the jaws is thin rod or lamella also of iron. The player holds the fork between his teeth and plucks the free end of the lamella, producing a thin sound. The mouth—its shape and size—blowing and suction of air act as resonating and modulating factors of tone and loudness. It is difficult to ascribe to the instrument an accurate pitch ; this can be, to a certain extent, generally defined and the instrument even tuned by the application of wax at the free end of the plucked rod. The *moorsing* is essentially a rhythmic instrument and even *mridangam* and *tabla* mnemonics can be played on it, though a sense of melodic variations is strongly felt (Fig. 5.24).

D. Shaken rods and rings

The *dahara* of Jammu and Kashmir is an example of an idiophone with rods and rings. It is an iron bar of about 75 cm. in length, curved at one end like a shepherd's stick and a handle-like cross bar at the other. About forty rings, also of iron, are borne on this rod on shaking which a jingling sound is given out. The *dahara* is commonly used with the *Laddhi shah* songs of this area and hence the instrument is also often called the *laddhi shah* (Fig. 5.25).

E. Rubbed idiophones

The scraper or rasp is one of the most primeval instruments though it can hardly appear to be one, for it cannot generate even a single note which the simplest of melodies requires. Nevertheless its noisy rhythm is quite effective emotionally ; and it is thus a musical instrument. For at the very primitive levels noise, music, expletives and grunts can scarcely be distinguished.

The scraper, rasp or stridulator is made of bone, shell, wood, gourd or metal. On the surface of such material notches at regular or irregular intervals are made and a rod or spike of some hard material is scraped up and down the serrated surface, producing a very indefinite noise.

It is quite possible that the fire-making implements of early man have been metamorphosed into stridulators. Even today Paniyans of Kerala use a scraper-like bamboo rod to make fire by rubbing. Again, being an instrument of musical border lines, it is also a part of magic and sacrificial ritual. In ancient Mexico, for instance, rasps made of human bones were 'played' at a royal funeral and the 'players' were eventually put to death. The antelope-horn scraper is an instrument of court-ship of Cheyenne Indian tribe of America. In our land, the Savaras use it as a wedding oath instrument, and Kanikars to drive out devils.

Being a primitive instrument it is rarely found mentioned in classical texts on Indian music. Perhaps it is the *thattai* mentioned in the Tamil Sangam work *Pattupattui* ; and *Sangeeta Ratnakara* (13th Cent.) refers to *kirikittaka* (*sukti vadya*] a metal rasp. However, it is widely represented in paintings and sculptures. One of the earliest is from Ajanta murals (cave 17) of about 5th-6th Cent. Similarly Ellora has *gana* playing on a scraper. The *Arkesvara* temple in Hale Alur (Mysore State, 11th Cent..) has such a figure. But the finest example comes from the *Chennakesvara* temple in Belur (Mysore State, 12th Cent.). Here a mere scraper has been made into a thing of great beauty, with a hooded snake at one end ; this is, perhaps, the *kirikittaka*. The interesting fact is that in all these representations come from South of Vindhyas to which areas the original inhabitants of India must have been driven by the invaders from the North.

The instrument is scattered in various corners of the world. Mexicans had a scraped bone, called *omichicahuaztli*, on which was played melancholy 'music' at funeral services. A companion instrument to this was a *yotl* (turtle shell) struck with a stag's antler. The Chinese, *yu*, is a piece of wood carved in the shape of a crouching tiger, along the dented spine of which is moved a rod of bamboo.

In our country it is found used by various tribes such as Savaras, Pulayas, Kanikans and so on. The Savaras, now mainly found in Southern Orissa and Northern Andhra, are one of the oldest tribes in India, noted for their musical propensities. Besides various other instruments they have two kinds of rasps. The *doddurajan* is a bamboo tube which bears a lengthwise slit. On either side of the slit are notches which are scraped with a stick. The *ragabdrajan* is another special stridulator to which is appended gourd resonators which also act as drink-vessels. The instrument is beautifully decorated with peacock's feathers and is specially used in marriages. This gourd, the bamboo rod and peacock-feathers make a powerful oath—the irrevocable promise of handing over the daughter. The *ruga braia* is a scraper found among some tribes in Andhra. It is a hollow bamboo tube of about half a metre in length and five centimetres in diameter. Along the length of the tube a slit is cut and on the surfaces on either side of the slit, notches are made which are scraped with wooden wedges called the *dangu*.

Another rasp of interest is the *kokkara* found in Kerala. It is an iron sheet rolled to form a tube (about two feet in length and two inches in diameter). The edges of the sheet do not, however, fully meet but are slightly raised and are serrated irregularly. This rough edge is rubbed with an iron rod, giving out a rasping noise. The Pulayas and the Kanikars of Kerala use the *kokkara* in sorcery and witchoraft. Fox-Strangways gives a very moving account of a *kokkara* performance by a group of *Kanikars*. The leaders of the troupe bowed over the *kokkara*, murmured a prayer and started scraping it. One by one the rest followed him, yelling and stamping, into a frenzy and Fox-Strangways remarks, "One felt ashamed to have been merely an interested spectator amongst so much sincerity." (Fig. 5.26)

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CHAPTER VI

AVANADDHA VADYA (MEMBRANOPHONES)

Next to the idiophones, possibly, the membranophones are the earliest. First, since the rhythmic impulses might have been more primitive than melodic ones, it is likely that these are prior to string and wind instruments which are in the main melodic. Secondly, it is obvious that it takes less inventiveness to cover a cooking pot with a skin than to construct a chordophone. However, we may note that the plucked chord of the hunting bow could also have been one of the earliest instrument of rhythm (see *buang ;* or even the *villaḍi vadyam* which is struck). The origins of drums of various kinds are not definitely known. The oldest form was, most probably, derived from the stamped pit. This was a hollow in the ground covered with barks or planks on which men and women stamped or beat with sticks. Eventually, the bark might have been substituted by the hide of animals. Such a one was the *bhoomi dundubhi* mentioned in the *veda*-s. A ritual drum, it comprised a pit in the ground and, stretched across it, the hide of an ox with the hair and the tail in tact. The tail itself was used to beat the membrane. Another line of development was the employment of cooking and storage pots and pans. Even today we come across the *ghumat*, the *ghumera*, the mate and so on which are nothing more than vessels used for cooking and storing water (*surahi*, *kooja*) covered with animal skin. Again tubular wooden drums are more ancient than earthen ones ; for felling a tree, scooping out its inner portions and covering the ends of the tube so formed is a much earlier process than fashioning pottery. But since clay can be turned to any shape and thickness more easily than wood, it must have replaced wood at later stages. On the other hand, the very fragility of such bodies makes them inconvenient in the long run ; hence there is a reversion to wood (and then come the metallic bodies) which reversion might also have been dictated by the tonal qualities of wood. In highly sophisticated musical system like ours such instruments are even now made of wood : as for instance the *tabla*, the *mrdangam*, the *pakhavaj* and so on.

Drums have not always been of musical use ; the *ranabheri*, for instance, was a martial instrument and the village announcer with his strident *duff* is a well known figure to us. There are the signalling drums of Africa, where codes are drummed out, for many African languages are tonal. That is, a word acquires different meanings just by changing the intonation. For example the word *isi* of Ibo language can have a variety of meanings by changing its tone. "Ndi *isi isi* ahu bipuru *isi* ndi *isi* he dotara n'agha", would mean, "Those six headmen cut off the heads of six blind men captured in the battle", *isi* meaning "head", "six" and "blind". Ibo people 'speak' this sentence through their instruments (drums being one of them) by variations in rhythm and accent.

The musical association of drums starts however with primitive dance-music rituals. Even today, the great variety of folk drums are *nrityanuga*—i.e., accompaniments to dance. Of course, in primitive and folk music, dance and music are inseparable. It is only with the growth of the sophisticated leisured class in society, that these forms of art are 'separated' and 'specialized'.

Because of the ritualistic association in early human societies, drums have had a magical value. "The drum is indispensable in primitive life ; no instrument has so many ritual tasks, no instrument is held more sacred." "When the anthropologist John Roscoe came to the Banyankole (East Africa) he found, at a little distance from the Royal *kral*, a 'small enclosure' in which stood the hut of the royal drums. The hut was always domed and might have no point or pinnacle ; inside there was a stand or bed on which lay two drums. At the back of the hut behind the bed lay a quantity of material for repairing these drums, and this had to be carefully guarded for it might not be used for any other purpose. To the left of the hut was a bag, in which were the instruments necessary for taking an augury should it be needed, and beside it lay some whistles and iron rod upon which the tools for making the drums were sharpened, for this might not be done upon a stone. In front of the bed or stand was a row of milk pots belonging to the drums in which the daily offerings of milk were put. The chief drums were the two which lay upon the bed. These were covered with white skins with a black strip across them, making them look like a pair of great eyes in the gloom of the hut. A sacred herd of cows yielded a supply of milk which was daily offered to these drums in the pots which stood in front of them. It was placed there in the morning and remained until nine or ten o'clock, by which time the drum-spirits had taken the essence and the remainder might be drunk by the guardians. There was also a woman, who was known as the 'wife of the drum', and whose duty it was to look after the milk, the churning, and the covering of the drums. Another woman looked after the fire in the drum-house, which had always to be kept burning because the drum-spirits required warmth. Offerings of cattle or beer were made to the drums by chiefs when a son had been born to them or when they had received promotion to some office or had been successful in some expedition and earned the commendation of the king. The king also made an annual offering of cows to the drums, so that they possessed a large herd; those offered to the first of them had to be red or white and those for the second black. These cows were sacred and the king alone might order one to be killed; no one but the guardians might eat the meat of an animal thus killed and the skin was kept for repairing the drums. It was from these cows that the milk was taken which was daily offered to the drums, and from the surplus milk butter was made for smearing on them......"

The Savara tribe of Orissa has an interesting legend about the origin of the drums. "At the beginning men had no instruments of music. When any one died or was married, there was no means of sending the news to other village. Kittung wondered how he could remedy this. 'I'll make music so that all men may know when there is a funeral or a wedding, and this will also cheer them.' Kittung made a *dollun* drum and covered it with buffalo-hide. With clay he made a *dagadan* drum and covered it with cow-hide. He made a gong with a brass dish. When everything was ready he called Ramma and told him to take the instruments and whenever he sacrificed or when some one died or got married, he should dance, drink and make a noise. Ramma took the things and when he next sacrificed, he called the Savaras of four or five villages and gave them wine and made the boys and girls dance with the drums and flutes. The gods were pleased and this good custom spread to every village."

Drums, as many other objects have close associations with rituals connected with procreation. Drums are usually taken to be feminine symbols, the sticks used for beating them being masculine. In some societies women are not allowed to play drums ; if at all they do play them, fingers are employed but not sticks.

We have also the relegation of drums to various castes. Drummers of certain castes are called in for various ceremonies rituals as marriage and death. It is said that till recent times, orthodox Brahmins would not play the drum as it was made of the hide of animals. Women have, however, not been barred generally from being drummers. Wandering beggar women, the *domma* (wayside acrobats) women and women in marriage parties are not strangers to us. Even as long ago as the society of Buddhist times women drummers were a part of the royal entourage. Apart from slave women royal retinues comprised large troupes of women musicians. Princes and lords lived in seasonal palaces ministered to by female musicians "among whom no man was". The instruments played by these women were flutes, lutes and drums.

The worship of the tools of one's trade on *Ayudha puja* day is practice with Hindu families; musicians therefore worship their instruments with great reverence and Bharata, in his *Natya sastra*, gives an elaborate ritual for the worship of drums. Types of drums, their presiding deities, the different offerings of honey, *payasa*, various flowers etc., are given there in great detail.

In our own country the sacred association of the *damaru* with Lord Shiva is familiar. The drum connotes the primeval *nada* the origin of creation. It also stands for all sound and revelation. Note here that the *veda*-s themselves were *sruti*-s (heard, revealed) and not *smriti*-s (remembered records). Sound being associated with *Ether* the first of five elements and from which they unfold, the symbology gains added significance.

Drums are of various types and they have been classified on the basis of their position of play, their shapes and structure.

Oordhvaka, *ankya* and *alingya* are three classes. *Oordhvaka* drums are held or placed vertically, like the *chenda* of Kerala, the *tabla* and *baya* etc, *Ankya* drums are held horizontally and played; *dholak*, *pakhavaj*, modern *mridang*, *khol*, *pung* are of this class. *Alingya* drums are 'embraced'. They are held under one arm and played with the other.

On the basis of shape, Bharata talks of three kinds of drums. He says that the *anki* or *ankika* is like a myrobolan, the *oordhvaka* like a barley and *alingya* like a cow's tail.

Drums are also classed as barrel and frame drums. These we may call the closed and the open type. The closed ones are those in which the hollow body of the instrument is covered either at one or both ends by a membrane. Of the former kind are the *tabla*, *baya*, *nagara*, *ghumar*, etc. An open drum usually comprises a circular (or sometimes octagonal) frame which is covered with leather on one side: for example, *ḍuff*, *khanjeera*, etc.

While these are only very general divisions, a more detailed and systematic schedule, for Indian drums, is given and adapted here:

II. MEMBRANOPHONES

II. 1. STRUCK

II. 1. A. **Frame**

- i. Monofacial (open)
- ii. Bifacial (closed)

II. 1. B. **Vessels**

- i. *Monofacial*
  - a. Open
  - b. Closed
- ii. *Bifacial*
  - a. Cylindrical
  - b. Bulging
  - c. Waisted
- iii. *Multifacial*

II. 2. RUBBED

- A. Cylindrical
- B. Waisted

II. 3. PLUCKED

The above scheme is based on the manner of playing, relation of depth to diameter (frame or otherwise), number of faces and shape. Striking includes beating with sticks, hands or any other implement. Whether there can be plucked membrane at all is questionable. This class is put here more for the sake of completion of the schematum and will be discussed later.

II. 1. STRUCK MEMBRANOPHONES

A. FRAME DRUMS

We may here define frame drums as those membranophones wherein the body is shallow, the diameter being much larger than the depth. Further, it is not generally scooped out of a block of wood nor is it a bowl or a pot. It is a narrow strip of wood or iron bent more or less in the form of a circle on which skin is stretched. Usually the hide is fixed on one side of the frame ; but there are frame drums with both the faces covered. The method of playing is also of two kinds : with bare hands and fingers or with sticks which were known as *Koṇa* in ancient times.

The indigenous antiquity of such instruments in India is difficult to establish ; for most of the names by which they are called have close relations to cultures outside this land, though the instrument itself—in some form or name – is found among our tribes. Sumerian excavations have yielded stauettes of women playing drums of this kind and these finds are dated about 2000 B.C. Egyptian frame drums are datable to 700 B.C. And here we may note the close resemblance of Sumerian and Egyptian terms to Indian words. South India has the following for large circular frame drums : *tammaṭe´* (Kannada), *tammaṭṭai* (Tamil), *tammaṭa* (Telugu). Other variations are *tappaṭe´*, *tappaṭai* and *tappeṭa*. The Singhalese also has the *temmeṭṭamma*. This may be compared to the Akkadian *timbuṭu*, signifying 'ring', which was the name for Babylonian frame drum used in temples. The North Indian word *ḍaff* (which gets transformed in the south into *ḍappu*, *ḍafli* and even *ṭep*) also has West Asian roots, as the Arabic has *ḍaff*, perhaps linked to the Hebrew *ṭof* (Sumerian—*oḍapa*, Akkadian—*aṭapu*).

The earliest visual representations in India are found in Bhaarhut (2nd Century B.C.) ; Later on in Saanchi (1st B.C. 2nd A.D.), Mathura (2nd A.D.), Amaravati (2-3 Century A.D. and Nagarjunakonda (2nd Century A.D.). The literary and textual references are confusing. The *ḍaff* is usually equated with the ancient *paṭaha* which finds mention in *Mahabharata* and later literature. Also, Bharata who refers to it treats it as a minor drum. But these mere mentions do not confirm that the *paṭaha* was a frame drum, because, later authors such as Ahobala and Pratapshing Dev describe the *paṭaha* as a barrel drum and call it a *ḍhole*. Here then is another instance of confusion in nomenclature, making identification difficult.

(i) Of the single faced frame drums, we may recognize three types :

There is a class of instruments where the frame is large—40 to 60 cm in diameter. The skin of an ox, a cow or a buffalo is fixed to the narrow frame : either nailed or held by means of chords at the back of the drum. Hands and sticks are used for playing. To this group belong the *daff* (throughout north India), the *changu* (Orissa), the *tammaṭṭe* (southern India), the *halgi* (Mysore and Maharashtra), the ghera (octagonal frame, Rajasthan). (Figs. 3.2 and 6.1)

Another type consists of smaller instruments—about 20 to 40 cm. in diameter—with jingle plates of brass fixed to the rim. A number of slits are made on the frame and the metal discs are held in the eyelets by means of nails passing across the gap. Such a frame drum is known as the *khanjari* throughout the country and is invariably played with the hands. (Fig. 6.2)

A third kind is even smaller in size, measuring about 15 to 20 cm. across. The frame is also slightly deeper than in the *daff* and the *khanjari*. The skin used is often that of a lizard (iguana). The best known of these is the *kanjeera* of South India. While almost all of the frame drums are used in tribal and folk music and dance, the *kanjeera* has become a concert instrument in Karnatak music. Here it is not the principal accompaniment , yet it is an effective auxiliary to the *mridangam* and the *ghaṭam*. (Fig. 6.3)

Besides these frame drums there is another variety which is not common and wherein the rim has almost no depth at all. Since there is only one membrane fixed onto a metal ring, we can classify it under the single faced frame drums. But in structure and manner of playing it is so different from the *daff* group that we may place this category in a sub-class. There are two membranophones of this kind : *soorya pirai* (*soorya mandalam*) and *chandra pirai* (*chandra mandalam*). The former has a circular iron ring over which is stretched a thin hide—it is sun shaped and hence the apellation *soorya*. The second instrument is similar to this one, the only difference being that the frame is in the form of crescent moon : therefore the prefix *chandra.* The ring or frame has a handle which is fixed to a narrow bent strip of iron. This strip is tied to the forehead of the player who beats the *pirai* with thin sticks on both sides. Found in some rural areas of Andhra and Tamil Nadu, these drums are parts of ensembles in the worship of goddess Maariyamma. (Fig. 6.4)

(ii) Of the two faced frame drums there are not many in India. One is the *chadchadi* of Orissa. Used mostly by the tribals, it is fairly large in diameter and about 30 cm. in depth (and hence classifiable also with the barrel cylindrical drums). It is covered on both sides with ox hide, but is played generally on one face. The drum is slung round the neck or the shoulder and beaten with sticks. A similar instrument is the *murichenda* of Kerala. While these folk drums fall on the border lines of frame and barrel drums, the *gna* of northern hills is a typical bifacial frame drum. Used in Bhutan and contiguous areas of Himachal by the Tibetan (Mongoloid) stock of people, the *gna* has a diameter of about 50 to 60 cms. and a depth of 10 to 15 cms., with both sides of the frame covered. The instrument is held by its long handle and beaten with a curved stick (*gnyataa*). (Figs. 6.5, 6.6)

II. 1.B. Vessels

Bhanḍa vadya seems to have been the ancient Indian word used to indicate drums made of closed, more or less spherical bodies. *Bhanḍa* literally means a vessel or pot and hence the term *bhanḍa vadya.* References to *bhanḍa* are said to occur in vedic literature ; Kautilya's *Artha Sastra* mentions *vadya bhanḍa* ; *Ramayana* gives *kumbha* (pot) and the Buddhist sacred book, *Pali Tripeetaka* refers to *kumbha toonak* which some consider to be pot drums. *Naṭya Sastra,* while talking of *bhanḍa vadya,* places them in a secondary position to the three main drums (*mridanga, dardura* and *paṇava*), Here by *bhanḍa vadya* we shall also mean these drums shaped like cups, bowls, pots, pans and so on, covered on one or two sides with hide. (See also Ch. 5.) Membranophones of this kind are not commonly met with in concert music—the exceptions being the *tabla* and the *banya*. The usual shapes seen are of *surahi* or *kooja*, bowl, pan, pot, cup barrel and and so on ; of course, the sizes and variations in shapes are numerous.

(i) *Monofacial*

a. Of the drums, open on one side, the common ones are the *surahi* or *kooja* shape : that is, a spherical belly is elongated into a long neck. Examples of this class are the *gummaṭi* and the *burra* of Andhra, the *ghumaṭ* of Goa, the *ghumera* of Orissa and the *tumbaknari* of Kashmir. Generally they are covered on one side and open on the other. In the *gummaṭi*, the *burra* and the *ghumat*, it is the wider side, nearer the belly, that is fixed with skin—of ox, cow, buffalo or iguana. But the *ghumera* and the *tumbaknari* have the mouth of the narrow neck laced with membrane. In all these instruments, the player beats the leather with his fingers and uses the palm of the other hand to modulate the volume and the quality of sound by opening and closing the hole on the opposite side. Almost all of these drums are earthen, except the *burra* which is of brass and has a special iron ring to hold the skin. (Figs. 6.7, 6.8.)

b. Of the ancient pot drums in which one side is a covered mouth and the other is closed was the *dardura*, mentioned in Paanini's *Asthadhyayi* (7th Century B.C.). By Bharat's time it had become an important member of the trio—the *mridanga*, the *panava* and the *dardura*. He also gives the details of playing this instrument and its place in the ensemble (*kutapa*) as on the left of the *mridanga*. Today, pot drums of spherical shape are absent in concert music and entirely confined to folk and slightly more sophisticated music. Of these we may note the *pabuji ki mate'*, the *kuḍamuzha* and the *mizhavu*. The first, used by the Nayaks of Rajasthan, is pair of earthern pots ; the large mouth of each is covered with hide tied by means of leather thongs. This head, measuring about 35 cms. across, is beaten with the hands. The *kudamuzha* of Tamil Nadu is, however, a small copper pot (*kuḍam*=pot). The skin over the mouth is held taut by an iron ring which is tied to the vessel by means of a rope passing round the *kuḍam*. A pair of *kuḍa muzha*-s is usually played along with the *pancha mukha vadyam* (q.v). The *mizhavu*, found in Kerala, on the other hand, is a very large copper pot having a small opening onto which is stretched the membrane ; generally played in the *kooṭiyaṭṭam* dance, it has a very strident sound because of the size of the mouth. (Figs. 6.9, 6.10, 6.11)

There is a class of unifaced membranophones which are neither as shallow as the frame drums nor deep like the pots and cups. One could call these as bowls and pans. To this category belong the *tasha* (North India), the *turubuli* (Rajgonds of Andhra), the *tase'* and the *bidi* (Mysore). All these are similar to varying degrees : in shape they are like shallow bowls ; the body is made of wood, burnt clay or even metal. Across the face—which may range from 15 cms. to 40 cms. in diameter—animal hide is fixed, braced by means of rope or leather strap. A pair of sticks is used for playing ; if the instrument is small it is slung from the neck, or placed on the ground if large. All these are folk or tribal instruments, though one does come across the use of the *tasha* with the *shehnai* in concerts. By and large, however, they are a part of temple ensembles, wedding processions or the tools of trade of the village announcer. (Fig. 6.12)

One of the most ancient and widely distributed group is of the cup shaped type, also often referred to as the conical drum or kettle drum. The class as a whole is characterised by its shape : narrow at the bottom and wide at the top. It is this upper side that has the hide which is played with the hands or sticks (or similar implements). The skin is usually laced to the body which may be earthen, wooden or metallic (iron, copper, brass). The sizes also may vary from the enormous upper Indian *nagara* which has often to be carted on wheels, to the diminutive *tamukku* of Tamil Nadu. Most of these are tribal and folk ; the exceptions are the *tabla* and the *bayan* (*dagga*, *duggi*) which have become the pre-eminent percussion accompaniments in Hindusthani music. (Figs. 6.13, 6.14)

Probably the earliest mention of such conical membranophones is in the vedic literature, as the *dundubhi*. (A reference to the *bhoomi dundubhi* has already been made.) While it is usual to interpret this word to mean a large conical drum ; Sachs is of the opinion that, "Modern Hindus mistakenly make the word synonymous with *nagara*, a modern kettle drum , no kettle drum existed in Vedic times or in post-Vedic antiquity, and the *dundubhi* was certainly a different kind of drum". The confusion is worse confounded by vague statements by a writer who, for example, gives both *dundubhi* and the *bhoomi dundubhi* as "instruments of the *dhole* group covered with hide" and a few pages later says "thus *dundubhi* or *nagara* had an important place in vedic literature" (Translation from Hindi). The *bheri* (cf. Tamil—*perikai*) is also commonly treated as the *dundubhi* or *nagara*. This word occurs in various *jataka*-s and there is one completely devoted to this drum : *Bherivada jataka*.

The *dundubhi* was an important part of vedic ceremonies and was itself considered sacred. Even now, it, along with other instruments, is kept in places of worship (*namghar*) of certain communities in Assam, of Santals and Oraons. Besides, the instrument was used as an announcer of war and peace. Today, it is a part of folk and tribal festivities ; for instance, the *nissan* and the *dhumsa* of Orissa are indispensable in the tribal dances of that region. The later version, the *nagara*, is ubiquitous throughout the northern parts of the country. (The *nagara* or *naqqara* is a word from Western Asia and here is an example of a foreign word replacing the local one.) Apart from its place in folk and tribal music, the *nagara* has always been a part of the *naubat* which is an ensemble of this drum and the *shehnai*. The most famous of such groups was the *Naqarkhana* of Emperor Akbar ; the *Ain-i-Akbari* describes it as having twenty pairs of *naqaras*.

It is usual to play the *nagara* in pair : there are two conical drums, the two collective being known as the *nagara*. (Some

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prefer call the pair *dundubhi*.) In some places, the smaller of the two is known as the *jheel*. Also, the larger one is often referred to as the *nar* (male) and the smaller as *madi* (female), because of the difference in size, and the volume as well as the pitch of the sound.

As the size of the drums become smaller, they become portable and are carried round the neck of the player, even on animal and human backs. Two such are the *kuntalam* (Fig. 3.3) of Tamil Nadu and the *tase* of Mysore. The drum pair of Maharashtra, known as the *sambal* (Fig. 6.15), is often taken on the back of a bullock during processions. In this region there is also the *chaughaḍa* : an ensemble with four conical drums (and hence the name, *chau*=four) and the *shehnai*. In fact, there are two pairs of drums : each pair comprising a large *nagara* and a smaller *ṭimki*.

The *ṭimki* of Orissa and the *tamukku* of Tamil Nadu are examples of diminutive conical drums. Shaped like a tea cup about 20 cms. in diameter at the beaten surface, they are made of earth or wood and covered with goat skin. The instrument is suspended from the neck of the player and beaten with sticks, as in the other drums described above. Sometimes, hardened automobile tyre strips are used for the same purpose.

Undoubtedly, the most sophisticated of membranophones of the cup or cone shape is the *tabla*, used throughout north India. The word is again a collective one and is employed to indicate the pair—the *tabla* (*or daayaan*) proper and the *bayan* (*dagga duggi*). As the *kheyal* form of singing and the 'lighter' instruments like the *sitar* slowly displaced the *dhrupad* and the *veena* (*been*), the *tabla* took the place of the *pakhavaj* , and today it is most prominent drum in upper India, used in folk, theatre, light and highbrow musics.

No one seems to know the correct history of the *tabla*. There have been discussions as to whether it is an indigenous instrument or an import from the Arabic and Persian areas. While it is not easy to resolve this difference of opinion, we have sufficient evidence to show that the *tabla* might have had local and pre-Islamic origin. Sculptures of pairs of vertically placed drums appear very early (6th-7th Centuries A.D.) and the application of paste to drum faces is a very old practice.

Conical drums as such are not new to this land. Tribal ones—big and small—have already been described. But of immediate interest is a cup-shaped drum, kept on the lap and beaten with hands (*not* sticks), shown in the dancing scene of the Pawaya panel (3rd Century A.D.).

Even as early as *Natya sastra* the art of applying the load was known. Bharata recommends that the mud should be free of gravel, sand, grass and husk. It should be sticky ; neither should the earth be "white, alkaline, pungent, yellow, black, sour or bitter". He advises the use of "blackish earth from a river bank, which is fine" after squeezing out the water. When such stuff of suitable quality is not available, wheat or barley flour could be applied to the drum face.

Again, it may be noted that out of the four *tabl*-s that Sachs lists, there is not one with a remote resemblance to the Indian *tabla.* Though Ameer Khusro, that repository of all Muslim innovations, is credited with the 'invention' of the *tabla*, even Abul Fazl, Akbar's historian, neither mentions nor describes this instrument. And, very probably, the early representations of the instrument, as it is now prevalent, come from about the 18th Century. What, in all likelihood, happened was that the small conical drums of ancient India underwent modifications and became the modern *tabla.* As for the name, the mid-West Asian people who migrated to India might have given their own generic term, *tabl*, to the local drums.

The instrument itself is of two pieces—the *tabla* and the *dagga* or *duggi*. The former is the right hand piece ; the latter is played wlth the left hand and hence is often called the *bayan* (left). But the collective name for both is *tabla*. The *tabla* proper or the *dayan* (right) is made of wood—*seesam*, *khair*, sandal or mango, the first being the best—and is about 30 cm. high. The diameter at the lower end is 20 cm. and the upper playing surface 17 cm. ; the general shape is that of an inverted coffee cup. The *dagga* is almost of the same height, though often shorter. The playing surface at the top is about 25 cm. across and the bottom base of about 5 cm. The drum has the appearance of a large tea cup and is made of burnt clay, wood or metal (steel), the last being the most common.

The hide stretched across the mouth and played on is known as the *pudi*. This is really not one but a multiple membrane, the central circular piece being glued to the peripheral strip (*kinara* or *chanti*). Such a complex set of hides is tied to a plaited ring (*gajra*), both the *pudi* and the *gajra* being of goat skin. These are fixed to the mouth by means of a leather brace called the *dval* or *singar* (buffalo hide, untanned, as used in Maharashtra is considered the best). There are usually sixteen holes *ghar* (=houses, as they are termed) and at the lower end of the bowl is another small plaited leather ring (*gudari*). The brace is passed through the sixteen holes of the *gajra* and the *gudari* and tightened, thus holding the *pudi* to the body. Underneath each pair of the bracing strips is kept a cylindrical piece of wood—8 cm. long and 2.5 cm. in diameter—in all eight. These are present only in the *tabla* but not in the *dagga*. By moving them up or down (struck with a metal hammer) the braces are tensed or loosened, thus varying the tension of the *pudi*. While this is a gross process, finer tuning is done by gently beating on the *gajra* itself with a hammer.

The most significant part of the *pudi* is the paste affixed to it. This is called the *syahi* and is a permanent loading—central in the *tabla* and eccentric on the *bayan*. The *syahi* is a finely ground mixture of iron powder, well heated and cooled (*loha bhasma*), glue (*saras*), paste of wheat flour and charcoal powder. It is applied layer by layer. On applying one layer it is polished with a smooth stone and before it is fully dry, the next one is put on. The thickness of each stratum and the total thickness as well have to be judged only by practice. Sometimes a temporary paste of only wheat flour is used for the *dagga*. Since the loading covers only a part of the *pudi*, there is a clear area between the *syahi* and the *chanti*, this is called the *lav* or *maidan*. (Figs. 6.16, 6.17)

In quality the sound of the *tabla* is slightly lighter than that of the *mridangam* and the *pakhavaj* and hence the instrument is used in various forms of light music and *kheyal* singing; and in versatility and tonal variety this drum has, indeed, few parallels.

(ii) **Bifacial**

While there may be controversies about the Indian origin and development of the *tabla*, there is little doubt that this country's contribution of two-faced drums to the musical world is unique. The land has so innumerable a variety—in quantity and quality—of this instruments that it is almost impossible to list them all. We may, however, divide them into three groups and consider some examples in each: cylindrical, bulging, and the waisted.

(a) We get evidence of typically cylindrical drums from the Indus civilization onwards. In some of the seals of Mohenjodaro can be seen figures of men playing long cylindrical drums. The instrument was obviously hung from the neck, held horizontally and played with the hands. Such huge membranophones are found even today amongst our tribes, as for instance the *kharram* of Assam and the *dhole* of the Reddis of Andhra. (Fig. 6.18)

Sculptural representations occur in Sanchi (2nd Century B. C.), Sikar (10th Century A. D.), Khajuraho (1000 A. D.), Konarak (13th Century A. D.), and many other sites. By the ninth century this kind of drum had already migrated and established itself in Indonesia as can be seen from the Borobodour reliefs.

Indeed, the cylindrical wooden drum was, perhaps, earlier than all other bifacial ones. For it is easier to fell a tree, hollow it out, and fix skin onto the resulting tube than to fashion clay of this shape. The large size of these early drums also bears this out. Earthen and metal bodies replaced wood later on.

The body of wood, clay, or metal—may be of any length, 25 cm. to 90 cm. The diameter of the head also varies in similar proportion, the animal hide being fixed either directly on the mouth or held by means of rings. There is usually a bracing of either leather or rope, passing from end to end, which is used for tightening the parchment. Sometimes small rings of metal, through which the braces pass, are also used for tuning the drum heads. Normally, this skin is plain, but one does meet loaded membranes, fixed with a temporary paste of flour or a permanent layer of iron filings. Sticks, curved or straight, and hands are used for playing; and the playing can be as intricately beautiful as any concert drumming. (Fig. 6.19)

The general name, met with throughout the country, for such instruments is *dhole*, a term used for almost any bifacial membranophone, particularly the folk ones. The word is applied to cylindrical and bulging drums, almost indiscriminately—sometimes even to conical ones. Variants of this name also occur— *dole*, *dolu*, *dollu* ; the *dhak* of Bengal is a particularly large variety. The size of the instrument makes its sound deep and loud, specially suitable for outdoor dances, announcements—and, of course, ancient martial purposes. The smaller variety is the *dholak* or the *dholki*. The general principle of construction is the same as that of the *dhole* but being diminutive it is more amenable to indoor use—in marriages, *bhajan*-s and even, sometimes, in concerts of south India. The playing is done with the fingers. (Fig. 6.20)

The *nal* of Maharashtra and Gujrat borders between the symmetrically cylindrical and the asymmetrically bulging ones. About 60 cm. in length, it is made of wood ; but the body is not strictly cylindrical, being slightly of a larger diameter on one side. The faces are covered with goatskin held by hoops or by *gajra*-s ; braces of rope or leather (in modern instruments, even screws) serve to tighten the membrane as well as to tune it.

A typical folk drum of south India is the *pambai* (Tamil) or *pamba* (Telugu). This is really two cylindrical drums tied together and the pair is called the *pambai.* The drums are about 30 cm. in length and 15 cm. in diameter. The membranes of goatskin are held by means of metal rings which are tied together by rope. Tensing or loosing the rope adjusts the pitch of the instruments. This unit of two is tied to the waist or slung from the neck so that the component drums lie one above the other horizontally. The upper one, slightly smaller in diameter, is usually of brass or bronze and hence called the *vengala pambai* (*vengalam*=bronze, Tamil) ; the lower one, of wood, is also sometimes known as *veeru vanam.* The drums are beaten with thin curved sticks, often of betel tree. (Fig. 3.3)

Few drums are so characteristic of their society as the *chenda* of Kerala. This is found also in Mysore, as the *chende*, but it has not developed that strong social association as the *chenda* in the Malayalam area. While in structure it is not as refined as the *pakhavaj*, the *mridanga* or the *tabla*, in the technique of playing —particularly the rhythmic elaboration called *tayambakam* —it is equal to any drum. The cylindrical body, made of jackwood, is about 50 cm. in length and 25 cm. in diameter. The leather used for making the faces is of heifer. One side is a single plain parchment (what is called the 'left' side), but the other side (the 'right') is a complex set of hides, six or seven in number, of decreasing diameter, glued on one another. The leather is held by a bamboo or metal hoop and the hoops on either side are connected by rope braces. The drum is suspended from the neck of the player who plays it with a pair of sticks. Though both sides can be used for playing, only one is actually beaten. There is a variety of *chenda*-s, *acchan-chenda*, *veekku-chenda*, *uruttu-chenda*, *muri-chenda* and so on, differing in size, structure, and function. The instrument is one of the most versatile drums of this area, used in the dance ensemble

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of *Kathakali*, *kriyanga pancha vadyam* or the ritual instrumental groups of temples, *chenda melam* or an assemblage of rhythmic instruments. The drum is considered as an *asura vadyam* (demoniac instrument) and normally only its 'left' side is played, the right side being struck on specific occasions as, for instance, when the diety is brought on to the arena in *Kathakali* dance or in the *tantric* rituals connected with the worship of Goddess *Bhadrakali*. (Fig. 6.21)

(b) The bulging bifacial membranophones are a major contribution of India to the drums of the world—both in quantity and quality. One of the most ancient types, they can be ranked only with the cylindrical wooden drums in age. For, it is reasonable to assume that this shape can be produced only on the potter's wheel, later to be copied out in wood. That the earlier drums of this kind, particularly the *mridanga*, were made of clay is clear ; for Bharata very definitely states, " *Mridanga*-s are so called because of being made of *mrit* (earth)". We shall revert to this subject later.

The earliest representation of the bulging drums occur right from Bharhut (C. 150 B.C.) and Sanchi (C. 150 B.C.). From then on there is almost no sculptural or mural group which does not depict such an instrument of some type. There are variations in size, method of holding, strapping and so on ; but bulging drums are very ubiquitous in one shape or the other.

Membranophones of this class were recognised as of three shapes : myrobalan (*haritaki*), barley (*yava*) and cow's tail (*gopuccha*). What exactly these meant has been speculated upon by some ; a few have even given drawings of purported drums—mostly imaginary. We may offer a conjecture here. The myrobalan and the barley shaped were, perhaps, approximately symmetrical. That is, the bulge was in the centre and the slope to either side was more or less equal. In the case of the former, the elevation at the middle of the body was considerable—as, for instance, the present day *tavil* of south India. In the latter case, the drum—we may speculate—had a central bulge but to a less extent ; for example, today's *mridangam* of south India and the *pung* of Manipur. Of the cow's tail-shape it seems to mean that the bifaced drum was bulging, but asymmetrically. The barrel was considerably wider at one end and narrower at the other ; the *khole* of Bengal and,. to a less degree, the *pakhavaj*. As has already been noted, some kinds of *dhole*-s and *dholak*-s are convex and can be put in to one of these classes of shapes. Further, there is no strict distinction between the truly cylindrical and highly bulging—gradation of various degrees can occur.

The *pushkara*-s of this kind were also classified according to the position of play ; the *anki* or *ankika* placed on the lap (or horizontally, the player squatting)—the modern *mridanga* (?) ; the *oordhvaka*, held vertically—the modern *nagara*, the *tabla*, the *chenda*, the *alingya* or embraced—the modern *timila*. But according to Bharata the myrobalan-shaped drums were kept on the lap, the barley-shaped ones stood vertically and the cow's tail-shaped drums embraced.

A notable character of Indian drumming is the employment of multiple instruments by a single player. Even from Bharhut we come across such a practice. There were two bulging drums of similar shape and size, operated by one person ; one drum was kept vertically on the ground and one on the lap. Similar representations occur in many subsequent sites. For instance, Amaravati shows a tired woman *pushkara*-player with a drum on her lap and another placed erect in front of her, on which she has rested her head, trying to regain some lost sleep. The use of pairs of drums—even of the *mridanga* type is met with even today, as for instance in Tamil Nadu. *Tabla* and *dagga* are again such instrumental pairs. (Fig. 3.1)

Not only were there multiple *pushkara*-s played together, but each of such a set was differently tuned. This tuning was called *marjana* and was achieved by suitable application of *vilepana*. There were three principal kinds of *marjana* ; (i) *mayuri* had the left drum in *gandhara* (today's *komal gandhara*), the right drum in *shadja* and the *oordhvaka* in *madhyama* ; (ii) in the *ardhamayoori* type of *marjana* the left *pushkara* was tuned to

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shadja, the right to *rishabha* and the *oordhavaka* to *dhaivata* ; (iii) when the left one was in *rishabha*, the right in *shadja* and the *oordhavaka* in *panchama*, it was *karmaravi marjana*. Tuned sets of drums are not common now-a-days. But the *tabla* (right drum), the right face of the *mridanga* and the *pakhavaj* are adjusted to the tonic, *panchama* or *madhyama* accurately ; however, the left face and the *dagga* are of indefinitely low pitch (some claim, to an octave lower than the middle tonic). Sometimes a group of about eight or twelve *tabla*-s, known as the *tabla tarang*, tuned to various notes of the octave can be heard in some ensembles.

One of the ancient south Indian bifacial bulging membranophones was the *parai*. Perhaps, the word was a general term for drums and there is a variety of *parai*-s mentioned in Tamil literature ; *kanapparai*, *ciruparai*, *nalikaipparai*, *perumparai*. The word and the instruments still exist in the southern peninsula. For example, the Rajgond tribe of Andhra have the *para* which is of about 60 cm. length, both faces being of goat skin and struck with the hands. In Kerala also the *para* is a membranophone ; here it is worth noting that in Malayalam the word means not only a drum but also a vessel employed for measuring grain—a domestic implement turned into a musical instrument.

Current barrel drums most often met with are the *tavil*, the *mridangam*, the *pakhavaj*, the *khole* and the *pung*.

The *tavil* of southern India is commonly seen both in folk and concert music, invariably associated with the *nayanam* or the *nagasvaram*, the ensemble being known as the *periya melam*. It is said that formerly the body was cylindrical ; but the current instruments are barrel shaped, more or less symmetrical. The shell, carved out of a log of jackwood, is about 40 cm. long and less than half a centimetre in thickness. The sides are approximately equal, nearly 21 cm. in diameter ; the middle is 35 cm. across. The instrument is easily recognized by the way in which the parchment is fixed over rings attached to the body ; these hoops, one on each side, usually comprise a set of bamboo sticks bundled, tied, bent, and covered. Braces of leather connect the hoops and also go round the belly, at the middle, to tighten the membranes. No on-the-spot tuning is done as in the *tabla*, the *mridangam* and so on, the faces having been tensed while making the instrument. The membranes are sometimes multiple and often a paste is applied from inside. The playing is done either only with the fingers or with a stick on one side and fingers on the other. I may here, once again, point out the close similarity of the words *tavil*, *tabl* (Arabic), and *dawul* (Turkish)—all 'cylindrical' drums. (Fig. 3.3)

The word *mridanga* is also a very general and ancient one. Like the term *dhole*, it is applied to a whole class of barrel drums. The *mridangam* in south India is fairly specific, though it is also called as *maddalam* (Tamil, Telugu) or *maddale* (Kannada). However, in the north instruments with definite names like the *pakhavaj*, the *khole* and the *pung* are also referred to as the *mridanga*.

One of the earliest references is in the *Manava grihya sutra* and the *Kathaka grihya sutra* (8th-4th Century B.C.), and is also mentioned in Kautilya's *Artha sastra* (4th Century B.C.-3rd Century A.D.), *Mahabharata*, *Ramayana* as well as the Buddhist *Tripitaka* (25 B.C. ?).

It was one of the most important drums of Bharata's time, being one of the triumvirate—*mridanga*, *panava* and *dardura*. Even during the period of *Sarangadeva*, the *mridanga* retained its pre-eminent position, for his *tripushkara*-s were the *mridanga*, the *mardala*, and the *murja* which are all barrel drums. To-day it is still one of the best drums in the country.

Details of the *mridanga* are mentioned in the *Natya sastra*. The author gives different shapes (myrobalan, barley, cow's tail) and the position of play (vertical, horizontal, embraced). He further states that "the *mridanga*-s are so called because of being made of *mrit* (earth)". That is, the body or barrel was made of clay ; *mrit+anga=mridanga*. This is quite a reasonable statement, as many membranophones – primitive as well as sophisticated—have, even today, earthen bodies. However, some scholars are of the opinion that the words *mrit* and *anga*

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refer not to the barrel but to the clay or mud paste (*vilepana*) applied to the drum face.

By *mridangam* it is here meant a kind of two-faced bulging drum, found in south India. The body (*gulla*-Telugu) is hollowed out of a block of wood (jack wood is considered the best, though red wood or *neem* is also used). Depending upon whether it is high pitched (*hecchu sruti*) or low pitched (*taggu sruti*), the length varies from 55 to 60 cm ; similarly the bulge (*potta-Telugu*) has a diameter of 25 to 30 cm. and is asymmetrical, being large towards the left. The playing faces differ in diameter ; the left one, called the *toppi* (cap), ranges from 18 to 19.5 cm. and the right one, the *valantalai* (*vala*=right, *talai*=head –Tamil) of 15.5 to 17 cm. The *valantalai* (*kudi moota* –Telgu) is a complex membrane of three layers. The middle skin is the one that is complete ; the other two are annular rings The innermost ring is not visible to the eye, as it is covered by the other two. The middle one is known as *kottu tattu* (Tamil) or *pata* (Telugu) and the outer visible ring as the *vettu tattu* or *mittu* in Tamil and *reppa* in Telugu (corresponding to the *chanti* in the *tabla* and the *pakhavaj*). The left face is of two layers. The inner one is complete and covers the entire head ; over this is superimposed an annular ring of leather, visible on the outside. Each set of membranes is held by a plait called the *chattai* or the *pinnal* and the two *pinnal*-s are connected by leather braces (*var*) which are pulled to tighten the drum heads. The right face which is the one that is tunable bears a central loading (*soru*, *karanai* or *marundu*—Tamil) leaving a plain skin round itself and the *mittu* ; this blank area is the *chapu tole*. The *soru*, made of a mixture of manganese dust, tamarind, and boiled rice is thick in the centre and thinner towards the periphery. The *toppi*, however, is kept plain normally ; but before playing dough of rice or wheat is applied. This is a temporary load, scraped off after the performance. While the *valantalai* is tunable, by striking on the *chattai*, the *toppi* is not, though the application of the flour paste adjusts its pitch to an octave below that of its right counter-part. It may be noted that the *mridangam* usually does not have any tuning blocks as in the *tabla* or the *pakhavaj*. (Fig. 6.22)

Similar in construction and comparably prestigious to the *mridangam* is the *pakhavaj* (or *pakhvaz*) heard in Hindustani music. This instrument was closely linked with the *dhrupad* style of singing and the *been* or *veena*. But as these have been pushed to the background by the *kheyal* and the *sitar*, the *pakhavaj* has also been eclipsed by the *tabla*. Today there are not many virtuosi on this drum which is still restricted to accompany the *dhrupad*, the *veena* and *kathak* dance. Efforts are, however, being made at various levels to revive it, because the *pakhavaj* has a fine dignity and sobriety of tone and technique, not possible in the *tabla*. The instrument is also known as the *mridanga*, some making a distinction ; the *mridanga* as having a body of burnt clay and the *pakhavaj* of wood. The word is said to correspond to and derivable from *paksh vadya* ; *paksha*= sides, *vadya*=instrument. Another opinion is that it is from *paksha*=side and *avaz*=sound and the name seems to have entered into Hindi in the 15th century. The modern instrument is slightly longer than the *mridangam* and more asymmetrical. The length is 60 cm., the bulge of 90 cm. circumference ; the right face is of 16 cm. diameter and the left of 25 cm. The fixing of the covering leather is as in the *tabla* ; but only the right face bears a permanent *syahi* and is tunable. The left head gets a temporary loading of dough preliminary to the performance, as in the *mridangam*. Tuning is done just as in the *tabla* : by means of tuning blocks (*gattha*) as well as striking on the *gajra*. Like the *mridangam*, the *pakhavaj* is kept horizontally on the ground or on the lap and played with the hands ; in other words, it is an *ankya* drum. (Fig. 6.23)

The *khole* is to Bengal and Assam what the *chenda* is to Kerala. One cannot imagine the Vaishnavite music of the Eastrern area without this instrument. Indeed, it is held so sacred that it is always reverentially referred to as the *Sree khole* and not merely as the *khole*. The drum is said to have been introduced to Bengal and made popular there by the profound

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mystic singer *Sree Chaitanya* (1485-1533) who was also responsible for the widespread of Bhakti and the congregational singing of *keertan*. Likewise its prominent place in the devotional *sankeertan* song in the various *sattra*-s (monasteries) of Assam is due to the saint philosopher Sree Sankardev (1449-1598 A.D.), The body of the instrument is made of jack or mango wood ; when it is fashioned of earth, it is often referred to as the *mridanga*. The length of body is about 75 cm. ; the right face is of 15 cm. diameter and the left of 25 cm. The convexity is asymmetrical, being nearer to the left. Similar to the *pakhavaj* the drum heads are made of two membranes, the inner complete skin and the outer peripheral ring The two faces are held by braids which are connected by leather straps. There are no tuning blocks, for the pitch of the drum is adjusted and fixed by suitable tension of the braces while making the *sree khole* ; even the process of striking the plaits as in the *tabla* or the *pakhavaj* is not resorted to. (Fig. 6.24)

The *pung* is a characteristic drum of Manipur area. The wooden body bulges in the middle and slopes almost uniformly to both sides. The beaten heads are small and are covered with the usual black paste. The player hangs the instrument from his neck and plays it with his fingers (Fig. 6.25)

A close relative of the above is the *muraja* which is referred from as early as the *jataka*-s, the *Mahabharata* and the *Ramayana*. *Silappadikaram* mentions the *muzhavu* which, according to some, is the Tamil equivalent of the Sanskrit *muraja*. We have the *murasu*, also in Tamil.

(c). Waisted drums are also very ancient in our country, though today they are confined to folk music and there is no concert instrument of this kind at all. It is not certain whether the Indus civilization was acquainted with such membranophones. However, a terracotta figurine has been found which is that of a woman carrying on her left hip, a drumlike object, encircled by her left arm. It is surmised that this could have been a waisted drum, resembling a large sized *hudukka* of today.

The earliest sculptured representation of such a drum comes from Bharhut. Thereafter its picturization is quite extensive, as in Amaravati, Ajanta, Nagarjunakonda, Orissan temples (8-13 Century A.D.) and the Hoysala temples of Mysore (12th Century). The players used sticks (*kona*) of various types, as also the hands ; the instrument is hung from the neck or held embraced under one arm.

Vedic literature does not refer to any waisted drum but the *sootra*-s, as for example, the *Kathak grihya sootra*, mention the *panava* ; the *jataka*-s contain the word *dimdima*. Panini's *Asthadhyayi* also mentions the *dhakka* which might have been a drum of this class. The *Mahabharata* and the *Ramayana* have copious references to the *panava*, and the *dimdima*. From ancient Tamil words we infer that hourglass drums like *utukkai*, *itakki*, *timilai*, and *tamarukam* were used and these can even now be found in south India. (The words have very obvious relations to north Indian ones.)

Today there are many kinds and sizes of this group of instruments. In size they may vary from the *abzem* (about 90 cm. long) used by the Reddis of Andhra to the small *bud-budke'*, barely 5 cm. in length, a constant companion of the monkey-man. The methods of playing also are different—beating with a stick, striking with fingers or clapped with knotted strings. Even the techniques differ : from just plain striking to complicated melodic effects as in the *idakka*.

Bharata gives the dimensions of the *panava* as follows :

"The *panava* should be made sixteen fingers long and its middle should be thin, and faces should be eight and five fingers (in diameter).

"Its lips (i.e., rims) should be made half a finger (in thickness) and its middle should be hollow and four fingers (in diameter)."

The instrument was played, perhaps, with a stick (*kona*) or and/or the fingers : only the latter were used in some strokes and, sometimes, both fingers and stick were employed.

Today some of the waisted drums struck with the hand are the *abzem*, the *timila*, the *huruk*, the *deru* and the *udukkai*.

The *abzem* used by the Reddi community of Andhra is nearly 75 to 90 cm. long and is suspended from the neck and beaten with the hands. (Fig. 6.26)

The *timila* is peculiar to Kerala and is an important constituent of the *panchvadya* today, though it is mentioned in very early Tamil literature. It is about 55 to 75 cm. long and each face is of 15 cm. diameter. Goatskin is used to cover the heads and the membrane is kept taut by rope braces. The artiste suspends it from the shoulder and beats only one face with his hand. (Fig. 6.27)

The *huruk* or *hudukka*, the *deru* (compare the sound of the word with *damaru*) and the *udukkai* are more or less similar. *Huruk*, *deru*, and *dhak* are north Indian names ; in south India equivalents are *udukkai* and *tudi*. They are all made of wood or brass and the length is about 25 cm., the diameter of the faces being about 15 cm. The parchment which covers either side is held tight by means of rope and is beaten with the fingers or a small stick. An important detail about this instrument is the tonal variation obtainable. This is done by squeezing or pressing the chord at the waist : this chord runs over the longitudinal rope braces connecting the two membranous faces. The instrument is held in one hand and struck with the other. The hand that holds the middle of the *hudukka* is used to press or release the chord, which process increases or decreases the tension on the hide, changing its pitch. Fine tonal and rhythmic effects are thus obtained. Besides, the *udukkai* has a pair of thin hair, wires or guts, known as *kanni*, nailed across the face, opposite to the one beaten : but being behind the parchment, they cannot be seen from the outside. On the drum being struck on the playing head, the *kanni* vibrates producing an agreeable buzz. (Figs. 6.28)

In the *idakka* of Kerala, this contrivance for changing the tightness of vellum has been carried to a high degree of finesse. The instrument itself appears simple, but the construction is complicated. The body is of wood and waisted : length of the body is 25 cm. and the diameter of leather faces about

12 cm. Each membrane is fixed to a ring of metal and the two rings are connected by thick cotton threads. Now, the parchments are not permanently and immoveably attached to the body ; on the other hand they are only held fairly tense against the mouth of the body of the drum, by tightening the rope braces. Further the strap by which the *idakka* is suspended from the shoulder of the musician is also passed round the braces at the waist of the instrument. The player holds the wooden body at its middle, passing his hand in between the ropes and beats on one face. While striking the *idakka*, he slightly moves it up and down which action exerts differing pulls on the shoulder strap and hence on the chord round the braces. He also applies varying tensions on the chord itself ; besides, since the leather faces are not fixed to the body, he can move it a little, almost imperceptibly. All these produce highly controlled changes in pitch and intensity making the *idakka* almost a melodic drum. The present author has even heard Tyagaraja's *kriti*, *Ksheerasagara sayana* in *Devagandhari raga*, on this instrument. Since the notes are not very precise this drum is primarily a rhythmic one and not melodic, and is used in *panchavadya* and *kathakali* music. (Fig. 6.29, 6.30)

Of particular interest is the *madal*, found in the tribal belt of Orissa, Bihar, Madhya Pradesh, and eastern Uttar Pradesh, particularly among the Oraons, Santals and related ethnic groups. The word often gets modified into *mardal* and *mandar*. What is of even greater significance is that it seems to have a parallel (and derivable ?), in a slightly changed form in the *maddalam* and the *maddale*. But these two latter ones are bulging bifacial membranophones ; the *mridāngam*, in fact. Even in Orissa, the *pakhavaj* is often called *mardal*. Here again there is a mix up of nomenclature, because the *madal* is neither a bulging nor a cylindrical drum, though externally it appears to be one such. The shell of the *madal* is of burnt clay and is waisted, though the constriction at the centre is not as sharp as the *udukkai* or the *damaru* : it is much more gradual. Also the two mouths are of unequal sizes, the left being larger. The membranes are usually of monkey hide stretched across circular hoops or braids. The two hoops are interconnected by a leather strap, passing over and over again without touching the body. This gives the instrument the appearance of a truncated cone, specially as these leather strips almost hide the shell. The right face has a permanent load of iron filings and the left one of rice paste ; both faces are beaten with the hands. (Fig. 6.31).

The *damaru* has, for the Hindu mind, the same religious significance as the *veena* of Goddess Sarasvati and the flute of Lord Krishna. It is the drum of the Divine and Terrible Dancer, Siva. Indeed, the Primordial vibration of Creation was the sound of the *damaru* or *dhakka* of Lord Siva. From this originated also all the sounds of speech and music. Historically, however, the *damaru* and its variations like the *dhakka* and the *dimdima* are found mentioned in *Amarakosa* (5th Century A.D. ?), *Mahasutasoma jataka*, *Astaadhyaayi* (7th Century A.D.) and so on. Old Tamil literature also has references to *damarukam*. The difficulty, often, is to relate, with certainty, these names to a known instrument : for, the word *damaru* may often refer to any small waisted membranophone. Names such as the *dhakka* or its different forms sometimes may refer to the clapper drum to be described herein. Some of the names by which this class goes under are *damru*, *damaru*, *dambru*, *kudukuduppai*, *budbudke* and *budbudukalu*—the last two in south Indian languages, obviously onomotopoetic. It is heard rarely even in the more developed folk music, but is a companion of itinerant minstrels, soothsayers and monkey-men. Usually the length is of 10 cm., the diameter varying to suit the length. The shell is made of wood or brass : in unusual cases, as in the Lamaic, the body is of two human skulls fixed hind to hind. The drum faces of leather are attached to metal or bamboo rings and mutually connected by cotton or hemp threads which are tightened with another thread going round them at the region of the waist. Two cotton strings knotted at the free ends are tied at the constricted part of the body. The player holds the instrument at the waist and jerks it ; this action makes the knots strike or clap the faces, producing the sound. This is why this class of membranophones is often called the clapper drums. By pressing or loosening the braces, different rhythmic and pitch effects are obtained. (Fig. 6.32)

(iii). *Multifacial membranophones.* There are some drums which have been constructed with more than two faces. Except for the *panchamukha vadyam*, at present they are rare, if found at all, and even the *panchamukha vadyam* is not common.

Some scholars are of the opinion that the *pushkara traya* (three drums) referred to by Kalidasa, and even earlier by Bharata, was an instrument with three heads : they are also of the view that such drums were also *bhandavadya* (pot drum), though we have seen earlier while discussing the *mridanga* that the *pushkara traya* were three different drums. A three-faced vessel-like drum is to be found sculptured in Chidambaram. It has also been noticed in Aralaguppe, Karnataka (c. 9th Century A.D.).

Of the four-faced drum there is an example in the Dilvara temple of the 11th Century. The figure shows a musician accompanying Goddess Sarasvati on an instrument which can be considered as a fusion of two bifacial drums, at right angle to each other, intersecting at the central portions of their bodies.

The best known multi-faced membranophone is the *pancha-mukha vadyam*, the five-faced instrument which is still extant, but known only in Tamil Nadu (at least to the present author). Icons and reliefs can be found in the temples at Tiruppungoor, Udaiyarpalayam, Chidambaram and so on, but actual specimens are used in religious services of some temples as, for instance, of Tiruvarur. The drum comprises a large metallic pot made of bronze or copper and on its top it has five vertical broad tubes ; one corresponding to each of the directions of the compass and one at the centre. The head nearest to the drummer is considered as northern and the five faces are named after the five countenances of Lord Siva. They all differ from one another in pitch due to the differences in diameters and/or tensions. It is often the practice to use a pair of *kudamuzha*-s (small metallic pot drums) along with the *panchamukha vadyam.* Thus in all there are seven drum heads and it is said that they are tuned to the ancient *shadja grama.* (Fig. 6.10)

II. 2. RUBBED MEMBRANOPHONES

Rubbed or friction membranes are not common. The manner of production of sound in these is by rubbing the skin with a straight or a bent stick. Naturally there is no definite nature to this sound and it has only a vague rhythmic quality.

Here it is neeessary to define what is meant by friction drums. The present author would like to restrict the word to those membranophones where the *membrane* of the instrument is *actually rubbed.* Sachs and others have considered instruments where it is a gut or a stick inserted in a 'drum' and stroked as friction drums. A similar taxanomic grouping has also been done in the case of *baghra* of Orissa and the *nar hunkarnio* of Rajasthan. Here again it is the *gut* or the *feather* which is vibrated by friction and the covered pot acts only as a resonator ; in neither case is the membrane rubbed *directly.* I would classify all such instruments as stroked or rubbed chordophones and restrict only those drums where the parchment is *directly* rubbed as friction drums.

There are at least two friction drums known :

1. The *burburi* of Andhra and Karnataka is a bifacial cylindrical drum used by the wandering community of *Mariyamma* worshippers who go about with an idol of the deity on their heads, begging from door to door.

2. The *urumi* is a long waisted drum found in Tamil Nadu.

The difference between the two instruments cited is in their shape. Both of them are suspended from the neck of the player and struck with a stick on the side while the other is rubbed with a bent stick.

II. 3. PLUCKED MEMBRANOPHONES

Some organologists recognise a class of drums which are plucked. As an instance of this type the *Encyclopaedia Britannica* (1962) gives the 'Indian *gobi-yantra*'. The *premtal*, the *chonka*, etc. and even the *pulluvankudam* have been grouped under this head in one compilation. While instruments like the *chonka* could be treated as 'drums' by some stretching of organological reasoning, the *pulluvankudam* is by no means a membranophone but a chordophone.

It is not easy to classify these borderline cases. The best way is to decide upon which is the excitor and which the resonator, because the mere presence of a string does not make a chordophone ; neither the fixing of a membrane makes a membranophone. As an extreme case we may consider the attachment of snares (strings or guts across the mouth) in certain drums ; it would be absurd to put such a drum amongst the chordophones. Similarly the leather stretched on a *sarode* cannot possibly be a reason for considering it a membranophone.

In any instrument there are two significant parts :

1. The excitor which is the principal source of sound e.g., the string in a *veena*, the skin in a *mridanga* and so on.

2. The resonator which is not the originator of the sound but that which gives volume and quality to the sound.

It would, therefore, be logical to group instruments by the primary mechanism (excitor) and not by the secondary one (resonator).

In the present instance, instruments like the *chonka, apang, jamidika* have a gut of string as the excitor and the resonators are the membranes and the wooden cylinder. In this work, such instruments have been considered as chordophones where they will be described. That they can be thought of as membranophones is not denied. For it can be said that the string or gut is only a mechanism for 'plucking' the membrane. But in reality it is the string which is being plucked, not the membrane. Indeed, perhaps, there are only two ways of playing a drum : by striking and by friction.

Further Sachs points out that instruments like the *gopiyantra* (*ananda lahari*) are derivable from ground harps. If this is correct, and it appears to be so, this whole group is chordophonic and not membranophonic. What has happened is a bifurcation—often overlapping—of these strings into drones and rhythmic instruments. A functional, but not a structural, differentiation has taken place.

* * * *

Indian drum making and playing have evolved certain techniques which are not only peculiar to this land but, perhaps, unique in this craft and art.

First is the fact of the multiple layers of drum heads. We have already noted that one side of the *chenda* may have even seven skins. The most simple but yet the most effective method is the fixation of the marginal annular ring (*chanti*, *vittu tattu*) in the *mridanga*, the *tabla*, the *pakhavaj* and so on. This has the obvious function of preventing the direct contact of the vibrating membrane with the edges of the mouth of the body of the instrument. It also helps in obtaining a uniform tension, particularly by the connection to the plait (*gajra*, *pinnal*). It is also worth noting that there are always sixteen points at which the plait itself is tightened by the braces (*dval*, *varu*) and twentyfour points at which the *chanti* is fixed to the *gajra*. All this makes the drum head uniformly tense all round. The peripheral *kinara* or *vittu tattu* has also two other important functions. First, when the ring is wide, the duration of the tone is greater and *vice versa*. Secondly, a wide ring gives a grave muffled sound as in the *mridanga* ; but a narrow *chanti*, as in the *tabla*, gives a brighter tonal quality.

The other very fundamentally important aspect is the loading of the faces with *syahi* or *soru*. Such a modification to a plain leather is known not only in India, but in neighbouring areas like Burma. In our own country it was known to Bharata who calls it as *vilepana* and to the *Silappadikaram*, the

Tamil epic, which refers to the *muzhavu* as having a smear of mud. Today, as described earlier, the weighting is of iron filings, manganese ash, rice and glue. It is centric as in the *mridangam*, the *tabla*, the *khole* and such other drums, or it may be eccentric as in the *bayan*. Again the paste may be a temporary one of dough or permanent like the *syahi* or *soru*. It is most generally applied on the outside ; but in some *dholak*-s it is affixed on the inner surface, in which case the application is thin and cannot be seen from the outside. An interesting fact is (at least, as far as this author is aware of) that no frame drum or waisted drum has any kind of such coating. Of course, in a friction drum this is not possible at all. The mechanism naturally increases the mass of the playing face, lowering its pitch, but increases the vibrational energy, the heavy hollow body also helping the process. But more important, the sound acquires a 'musical' quality : for it is known, as C.V. Raman first described, that it is this *karanai* which produced proper overtones from the parchment. A plain skin, as for example, a *tappattai* or a *daff*, emanates a 'noisy' sound. The noise quality is, however, partly reduced by making the resonator cup-shaped as in the kettle drum of the West, the *dagga*, the *nagara* and so on.

The art of drumming has been raised to the finest degree not only by the division of the rhythm, but also by a complicated system of strokes. Each stroke has been given a name ; if a *tabla* is beaten on the rim with the forefinger it is *na* or *ta* ; the left drum beaten flat gives *kat* and so on. The right face of the *mridangam* struck at the centre with the fingers produces *nam*, *tam*. Such rhythmic alphabets are called by such names like *bole*, *jati*, *solkattu*. Of particular interest is the definition of a *tala* by these mnemonics. This is specially so in north India. Every *tala* has been assigned a basic set of *bole*-s and this set is called a *theka* and a *tala* is identified by its *theka*. A *theka* is so significant and important that *tala*-s with the same number of units and similar sections get differentiated by their *theka*-s : for a distinguishable time emphasis is thus obtained. This system of defining a *tala* by its *theka* is absent in Karnatak music.

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CHAPTER VII

SUSHIRA VADYA (AEROPHONES)

These are instruments which use air either directly or indirectly to produce sound. In most of the wind instruments we know of, air is made to vibrate and is the cause of tones; but in some cases, as in the harmonium, air is only a means to vibrate a reed which gives out the note.

If the origins of the other classes of instruments are vague, the beginnings of aerophones are even more indefinite. How did the first one come to be? Which were the most ancient ones? There is no incontrovertible answer. One of the speculations is that the wind passing through holes bored by insects in bamboos gave whistling sounds and that these might have suggested primitive wind instruments to early man. Another line I may suggest is the common habit of many people of speaking with the closed, hollowed palm in front of their mouths. This is a mark of respect towards the hearer. But it may also be a survival of the primitive custom of protecting one's word or voice from evil influences. Amongst one of the tribal peoples of New Guinea the king always held "a trumpet shell before his mouth when speaking to his people, so his voice had a hollow sound". There are some who "speak into a calabash on which they are able to reproduce five tones of their language". This method of hiding one's true voice might have given rise to ideas of not only resonance but also of globular flutes where air is blown across a hole in a hollow sphere of clay or other material. Almost everyone of us has played this game of blowing over the mouth of a bottle to produce a whistle.

The earliest wind instruments would have been made of hollow tubes readily available to man: horns, human and animal bone, and bamboo shoots. Even today trumpets of human thigh bones are used in Laddakh and contiguous areas; the buffalo horn—*seengh* (Hindi, Marathi, etc.), *kombu* or *kommu*

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(Tamil, Kannada, Telugu)—are common throughout India : and the metal curved trumpet still goes by the name of *seengh* or *kombu*, indicative of animal origins of the instrument as well as the name.

As far as this author is aware, specimens of such very ancient aerophones in India have not come to light, though the Indus valley excavations have brought out examples of whistles shaped like birds. Also conch shells have been found, but it is difficult to say whether they were really used as musical instruments. However, *vedic* literature has ample references to wind instruments like the *venu* and the *nadi* ; and it is supposed that flute players were offered as sacrifice in the *Mahavrata* ceremony. Unfortunately we have no information of the exact details of these flutes, except that the *venu* was of bamboo, reed or cane (*venu*—lit. bamboo, reed, cane). The *toonava* was another flute mentioned in these scriptures ; the *bakura* was also a wind instrument, perhaps a conch shell.

The classification of these various aerophones can be as follows :

III. AEROPHONES
  1. FREE AEROPHONES
  2. AIR AS VIBRATOR
    A. AIR REED
      (i) *Without beak*
        a. without special blow hole
        b. with special blow hole
          b′. without fipple hole
          b″. with fipple hole
      (ii) *With beak*
    B. LIP REED
      i. End blown
      ii. Side blown
    C. MECHANICAL REED
      (i) Beating reed
        a. single
        b. double

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3. AIR AS EXCITOR

FREE REED

(In the case of mechanical reeds, it is sometimes difficult to decide whether they act only as valves or are the main sound producers. All such instruments, except the harmonium, have been put in C. The problem becomes significant as—on the basis of discussion here—it has been suggested that the harmonium had its beginnings in instruments like the *khung*.)

This division is based on the mechanism of vibration of the air : that is, the air may itself oscillate and be the cause of sound or it may excite a reed which becomes the source of the tone. In some cases, very rarely so, the air may be outside the 'instrument'.

1. FREE AEROPHONES

In this class of instruments, the air is not confined in any tube or column but is external to it. Of this kind is what is known as the bull-roarer. This is just a flat piece of wood, a foot or two long, thin and fairly sharp at the edges. One end of it is tied to a long string which is held in one hand and rotated fast. As the wooden blade moves, the air round it is set in to fast motion, producing a roar. Perhaps, there is no child who has not played this as a toy. It is often used by farmers to frighten off birds ; but never has it been seen to be put to 'musical' uses. The author has not been able to obtain local Indian names of this implement.

2. AIR AS VIBRATOR

In these aerophones air is blown into a column and the flow of air is controlled by some kind of excitor or valve. In the first case, which may be called as air-reed there is no visible valvular mechanism whereas in others the air current is made intermittent by having a system of one or more valves.

A. AIR REED

Here air is sent directly into a tube and impinges on some kind of an edge in the instrument, setting up vibrations in the

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air inside the tube. In the common concert flute there is no special edge to interrupt the wind current ; but in beak-flutes like the *algoza* there is separate beak or mouthpiece : Thus it is possible to study flutes according to the nature and the position of the blowhole (embouchure) and the fipple hole. Here again there is enormous confounding of names. Terms of very general connotations are used to flutes of differing types. For instance, the Indo-Aryan words *venu*, *vamsi* and *bansri* may indicate any kind : horizontal, vertical, beaked, with or without a fipple hole. Since these names are derived from the material of which the instrument is made—bamboo (*vamsi* ?) –this kind of generalization is understandable. Similarly, the words *kolalu* (Kannada), *kuzhal* (Tamil, Malayalam) in a literary sense mean 'a tube' : hence flutes have unspecified names such as *pillan'uzhal* or *kuzhal* (Tamil), *kolalu* or *kolavi* (Kannada) and *pillanagrovi* (Telugu).

(i) a. There is a group of wind instruments, which may have either elongated tubes or globular bodies, where air is just blown across the open mouth at one end, the other end being open or closed. As mentioned earlier these are often seen as toys in the hands of children, blowing across empty bottles.

The earliest examples we have of this kind of aerophones are what have beeen called "bird whistles" found in the remains of Charhu-daro of the Indus valley complex (Fig. 7.1). The whistle is of clay and is shaped in the form of a bird with a hole at one end. One, of course, cannot now know whether it was ever a 'musical' instrument or a child's toy.

Two other instruments of this group are met with amongst the folk but never used in concert music. These are the *narh* and the *pheple*. The former, found in Rajasthan, is a long tube made of a kind of reed (the *kangore*). It is narrow in bore, open at both ends and of 55 cm. length. The player blows across one end, holding the tube slightly at downward angle manipulating four holes on the body of the *narh*. While blowing, he sort of 'hums'. with his vocal chords, which gives a kind

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of drone to the very simple melody. The *pheple* is an end blown whistle of the Mhar tribe of Manipur. It is a diminutive bamboo tube about 15 cm. in length, open at both ends. It is even more simple than the *narh*, not having any finger holes at all. In all these cases pitch variations and very simple tunes are got by changing the air pressure across the blowing end and/or manipulating the finger holes. (Fig. 7.2)

(i). b. No other wind instrument is so ubiquitous, popular and well known as the side blown flute without a fipple hole. Indeed, in India, the word flute means, more often than not, this type. It is known under different names like *venu*, *vamsi*, *bansi*, *bansuri*, *pava*, *murali*, *kolalu*, *kolavi*, *kuzhal*, *pillankuzhal*, *pillanagrovi* and so on. The sizes are equally varied—anywhere from 15 cm. to 60 cm. Most often bamboo (the best is said to be from Assam) is used for making it, though wood and metal ones are common. Further, the number of holes may be from four to six, particularly in the folk varieties.

Vedic literature mentions the *venu*; there are often references to the *toonava* and the *nadi* or *nali* (a kind of reed flute ?) : the latter was a special instrument to propitiate Lord Yama. The *toonava* was a part of the musical ensemble of *vedic* rituals and the flautist was one of the persons said to have been sacrificed in the *Purusamedha* ceremony. Later *sootra*-s also refer to the *nadi* and the *toonava*, and the *Jataka*-s to *venu*. From then on the *venu* gets too prolific a mention to need any referencing.

Pictorial representations are met with in Ajanta, Amaravati, Sikar, Khajuraho and innumerable other reliefs, paintings and sculptures. With the spread of the legend of Krishna, the Divine Cowherd, there is no corner of India without a description or visualization of the horizontal flute. In use, it is, perhaps, one instrument which is almost the same, right from tribal life (it is said that the Savaras invented the flute) to the concert platform. (Fig. 7.3, 7.4, 7.5)

The flute has had a very significant role to play in the musical theory in India. Besides the *veena* (to which we will have to turn later on), the *venu* was one of the early instruments to define the musical scale. *Naradiya siksha* (1st Century A.D.) gives us, perhaps for the first time, the relations of the *vedic* (descending) scale and that of the flute (ascending). It says :

यः सामगानां प्रथमः स वेणोर्मध्यमः स्वरः ॥ यो द्वितीयः स गान्धारस्तृतीय-
स्त्वृषभः स्मृतः ॥१॥ चतुर्थः षड्ज इत्याहुः पंचमो धैवतो भवेत् ॥ षष्ठो
निषादो विज्ञेयः सप्तमः पंचमः स्मृतः ॥२॥

That it is "the *svara* (note) which is *prathama* (first) in the singing of *samaveda* is the *madhyama* of the flute, *dviteeya* (second) is *gandhara triteeya* (third) is *rishabha*, *chaturtha* (fourth) is *shadja*, *panchama* (fifth) is *dhaivata*, *atisvara* is *nishada* and *krustha is* panchama". Tabulating this we have :

Vedic scale	Profane (flute) scale	Modern scale (Hindustani)
Prathama	*Madhyama*	Ma
Dviteeya	*Gandhara*	ga
Triteeya	*Rishabha*	Re
Chaturtha	*Shadja*	Sa
Panchama	*Dhaivata*	Dha
Atisvaara	*Nishada*	ni
Krustha	*Panchama*	Pa

(i). b. While in the flutes discussed so far the sound was produced by the air striking the edge of the blow hole, in the instruments to be described now. there is a separate fipple hole, apart from the blowhole. In this case wind is not blown against the edge of the embouchure but against the edge in a separate opening. While a concert instrument of this kind is hardly ever seen there are two folk types : the *jode pavo* and the *nedunkuzhal*.

Jode pavo (*pavo*. *veno*, *vanso*) belongs to Gujrat and is found among cowherds. It is essentially two 'beak' flutes connected by a single embouchure, though there is no regular beak as such. Each of the pair, made of bamboo or wood, consists of a flute at one end of which is a small opening. Through this hole air can pass on to the fipple, containing the edge. The two flutes are connected by these ends to a short metal tube which bears the blow hole. When the player blows into this opening, air passes through the small hole in each section and impinges on the edge in the fipple holes, producing sound. There are four holes in each part for playing the melody and the tuning is the same for the both; the instrument is held horizontally. (Fig. 7.6)

A very similar aerophone is the *nedunkuzhal* from Tamil Nadu, again a pastoral flute; *nedu* means long and *kuzhal* means a flute. Here there are no two separate flutes joined together, but one single tube serves the same purpose. The whole instrument comprises one single tube of three internodes of bamboo. The central internode bears a whole into which is inserted a small reed tube for blowing. At each node a small piece is cut off producing a gap which connects across the node the two neighbouring internodes. This aperture is covered with a thin metal sheet. The entire contrivance is designed to create an 'edge' at the node. As air passes along the flute, it strikes against this edge creating the sound. The instrument is held vertically, only the lower section with eight holes being the melody flute. The upper part is not played upon, but gives the tonic. (Fig. 7.7)

ii. *Beak flutes*

Beak flutes in this country are mainly used by tribal and folk musicians—rarely, if ever, by the sophisticated concert artists. It is very widely spread throughout the land, though to a less extent in the southern areas. The word used to denote this kind of flute also is equally general; *bansuri* in north India.

In a beak flute, the blowing is done into a special narrow aperture at one end. Since this is slightly 'pinched' in apearance, it is called a beak and such flutes are known as beak flutes or whistle flutes. The air from the beak strikes the edge in the fipple hole to give sound. The length may be anywhere from 20 cm. to 65 cm. and the number of holes may vary from four to eight.

Interesting varieties of this class are the *algoza* and *satara.* The former is found in Rajasthan, Punjab and in the south till Andhra. Both of them are similar in that they are flute-pairs. *Algoza* is a set of two flutes ; both beaks are held in the mouth and played together the tune, being produced simultaneously in both. The *satara* is from Rajasthan and the name is there applied to a double beak flute played like the *algoza.* The difference here is that one of the two instruments serves only as a drone, giving the tonic ; the other is employed to play the melody. The pitch of the drone can be adjusted by fixing wax to one or more of the holes. (Fig. 7.8, 7.15)

B. LIP-REED AEROPHONES

(i). Lip-reed instruments are those that are blown directly into, the lips acting as valves and functioning somewhat like the reed of a *shehnai.* To this group belong, the *shankh,* the *seengh* (horn), the *turahi,* the *kahala* and such others. Since it is very difficult to control the lips, accuracy of pitch is rarely possible and these aerophones have never found a place in our art music. But western musicians have developed mechanical valves and sliding mechanisms in their trumpets and trombones to give more controlled pitch.

The earliest of such aerophones were the animal horn, the conch shell and the human bone. The conch, of course, is found naturally and by cutting off one end, a hole is made which can be blown into. Animal horns and bones as well as bones of human beings have been employed, as they are strong yet hollow. Indeed, even today most of the metallic aerophones of folk music have the shape and the appellations of a horn ; (*seengh* in all Indo-Aryan languages and *kommu* or its variant *kombu* in the Dravidian) ; all these words mean horn.

The *khangling* is a trumpet* in Tibet, Bhutan, Laddhakh and contiguous areas. Made of human thigh bone, it is a part of the paraphernalia of ceremonial dances. The femur of a woman is preferred, perhaps, because it is light and has a larger bore. The tube inside has a single blowing orifice at one end but bifurcates, giving two openings at the further end. While playing the player moves his fingers in these holes to produce various effects. (Fig. 7.9)

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* We shall use the word *turahi* as a general class name for such instruments, i.e., aerophones in the form of a tube—*straight or bent—and played by blowing, using the lips as valves.*

Animal horn as a trumpet has been known from ancient times and is also found extensively throughout the world. Horns of oxen and buffaloes are common. With the inner marrow removed and the tapering end sawed off for blowing, a horn forms a very portable trumpet. Generally it is an end blown instrument, and its name in the local languages or dialects is just 'horn'—*seengh* (Hindi, Marathi, etc.), *sringa* (Sanskrit), *kombu* (Kannada, Tamil), *kommu* (Telugu). It was pre-eminently a martial or hunting signaller, calling men to arms, announcing victory or a successful catch.

Of the metallic trumpets one may recognize generally three shapes : straight, semi-circular, and S-shaped. While these differ in shape and size, there is one feature which is common to all ; the blowing end is small in diameter (with or without a special mouth piece) and the bore widens gradually ending in a flare. Again, the body may be made of one piece, or of three or more sections attached telescopically.

Of the straight trumpets, the *tiruchinnam* is of special interest, for it draws our attention to a possible link between south India and Egypt, for according to Sachs, it is very much like the trumpets of ancient Egypt and Assyria. The instrument is really a pair of conical brass tubes of thin bore and of about 75 cm. length. Both the trumpets are held at the mouth and blown simultaneously, These typically ritual instruments have travelled to Java where, for instance, they are shown in the Chandi Jawi reliefs of 13th century.

Other aerophones of this kind are the *ekkalam* (Tamil Nadu), *bhenr* (Oraon tribe of Bihar), *kahala* and *turahi* of the northern areas of India. The *ekkalam* is made of brass or copper, having four telescopic sections. The *bhenr* is a thin copper tube of a very narrow flue. Its length of nearly 105 cm. makes weilding the instrument difficult ; it is, therefore, supported by a long bamboo pole held by the player. The *kahala* is also metal trumpet, mentioned as early as in the *Rayapaseneeya* as *kahali*. Similarly the *turahi*, another metallic trumpet (brass, copper, silver), is also an ancient instrument. It is surmised that the *tureeya* found in some *Jataka*-s referred to not only the *turahi* but also to instrumental ensemble (*kutapa*). Kautilya's *Arthasastra* also has the word *toorya*, meaning both 'to play' and 'a variety of musical instrument'—presumably a trumpet. Straight *turahi*-s of different lengths and conicality can be seen right from Ajanta and Devalana (12th Century A.D.). A fine specimen of a long *kahala* is seen sculptured in the Sun temple at Konarak (13th Century). Today the *turahi* or its variants *turi*, *bhongal* (Rajasthani, Gujarati), *tuttari* (Marathi), *tuttoori* (Kannada), *karna* (Rajasthan, *karnal* (Himachal), *karnat* (Gujarat). The word *karna* (or its equivalents) is again of significance, as it is a pointer to the *quarna*, the Sumerian trumpet. If for nothing else but only for its impressive length of nearly two meters, the *thunchen* is of interest, though smaller ones of 160 cm. are also known. The *thunchen*, made of copper and sliver, is a ceremonial instrument of Laddakh, Bhutan, and Tibet, used by the Lamas ; usually a pair of them is played. The length and weight of the instrument are so great that boy assistants—or a special wooden stand—are employed to support it at one end, while the Lama blows at the other. (Figs. 7.10, 7.11)

A typical C-shaped instrument is the *kombu* or *kommu* found in the rural areas of south India and is commonly seen in marriages and ceremonial processions. Its shape and name indicate that it is a metallic imitation of the natural horn. Usually it is made of three to five tubes of brass joined to form a C. The playing end is narrow and has a mouth piece ; the farther end is wide and opens into a flare. (Fig. 7.12)

The S-shaped lip reed instrument is also very widely spread throughout the land. There is no corner in India where this is not found. The trumpet is made of brass, copper or silver and the length ranges from about 115 cm. and above. The names of course vary from region to region ; *narsingha* (Himachal), *vansingha* (Madhya Pradesh) ; *tutari* (Maharashtra—derivable from *turahi* ?), *konakombu* (Tamil), *bargu* (Rajasthan) and so on. Indeed, it is even often referred to as *seengh* or *kombu*, once again pointing to its origin from animal horn. (Fig. 7.13)

Here is another linguistic muddle. For the words *turahi, kombu, seengh* or their derivatives may refer to a straight, a C- or an S-shaped trumpet.

We may note also a further variation in shape ; a wholly snake like—even including the open mouth and the split tongue—brass instrument, the *nagphani* (Fig. 7.14). Its very name shows its construction ; *nag*—snake, *phani*—hood. It is common in Gujarat and Rajasthan where it is used in folk music.

Before closing this section we may refer to a peculiar trumpet, depicted in Sanchi. Two warriors are shown, each blowing an almost vertical long aerophone. At the blowing end it is slightly curved ; but the distal end opens out into the shape of the open mouth of some animal. (Fig. 7.15)

The conch (*shankh*) is an ancient instrument, though not always used for musical purposes. As a matter of fact, its musical associations are not extensive at all and perhaps, it has never attained the status of a serious musical instrument.

Most commonly it is used as a signalling instrument or a container. As instances of the former, its use (as an announcer of the battle) was well known. With the greater use of wood and metal, the conch was replaced by horns and bugles. Of course, where the conch was not available naturally and easily, animal horns and bugles must have served such a purpose. The personal associations of Arjuna with *Devdatta* and Krishan with *Panchajanya* are very familiar to every Hindu.

The conch has always had a sacred association for the Hindu. It is one of the most important adjuncts of worship.

It is not only used as a sacred instrument to be blown during ceremonial prayers, but it is also a container for holy water. Where a real conch is not available or a more durable material is desired, silver imitation of the conch, for instance, is used as a container of holy water. Mythological and religious associations of conch are widely known. It is one of the symbols with which Lord Vishnu is associated and one of the epithets for Vishnu is *Sankhabhrit*. Again, a sandal paste design of the conch is applied by some sects of Vaishnavites.

The conch is quite naturally associated with the ocean. It is but reasonable to state that the instrument must have been first used in civilizations by the ocean side. (It is, however, known in areas like Peru, quite far away from the sea). As a matter of fact, one of the Sanskrit names for conch is *jalaja* (born of water). Reciprocally, the ocean is also called *sankhin*. Further, the association of Vishnu with the milky ocean is too well known to need elaboration.

Literary references to the conch date back at least to the *Ramayana* and the *Mahabharata*. Visual representation of the conch is also quite prolific. Ajanta caves (2-10th Century) exhibit a number of instances. Amaravati is again another example. Representations of the conch may also be found in Bhaarhut (2nd Century B.C) and Nagarjuna Konda (3-5th A.D.).

The conch may be blown in three ways : side blown, and end blown or blown through an attached mouth piece. In the first two cases, the conch is blown into directly. In the first, the blow hole is at the side of the conch and in the second case at the top of the conch. The second variety is the most commonly depicted in paintings and sculptures, while conches with mouth pieces are to be seen in Bharhut. The author has not come across a side blown *sankh* in India.

The difficulty of controlling the breath and intonation has made its use as a musical instrument rare. Also its sound as a musical instrument is not rich. The present author, however, came across persons who could weild the conch as quite a plausible musical instrument. (Figs. 7.16, 3.3)

B. All the lip reed instruments described so far were end blown ; that is the blowhole, with or without a mouth piece, is at the tip of the tube. Though uncommon, there are some with the blowhole not at the end but on one side. Some conch shells of this kind are known in certain areas of the world ; in this country, however, side blown trumpets have not been described. The present author has come across only one specimen, the *seengha* of Orissa. It is a buffalo horn and the player blows into an orificc at the side near the narrow end.

C. MECHANICAL REED

The arophones discussed in the previous sections did not have any special valve to regulate the air current. In the air-reed instruments the production of sound was achieved by the air being blown against an edge either in the emboucher or in the fipple ; in the lip-reeds, the lips of the player acted as valves ; but the instrument itself has no built-in mechanism. But there are large and important groups of aerophones which have special mechanisms, the reeds, for controlling the entry of air into the instruments. Nonetheless, the pitch of the instrument itself is dependent on the air column in the tube or instrument, and not on the reed valves. It is for this reason that air has here been considered as the vibrator and not the excitor.

The reeds are of two general kinds : the beating and the free. In the former, a piece of wood, bamboo, cane or metal covers an aperture through which the wind flows, in such a manner that it (reed) strikes the edges of the hole. In other words the reed is larger than the orifice and closes it periodically. This is the case, for instance, in the *pungi*, the *tarpo* and so on. In the *shehnai* and the *nagasvaram* there are two reeds, with a small gap between them, beating against each other. On the other hand the free reed has almost the same dimensions of the airhole and hence vibrates within the shallot, without touching the edges ; this happens, for instance, in the harmonium.

i.a. The best known instrument in this group is the *pungi* the snake charmer's pipe. While it is extremely common, it goes under different names : *pungi*, *been*, *tumbi*, *nagasar*, *sapurer bansi* are the words used in northern areas ; *nagasvaram*, *mahudi*, *pungi* and *pambatti kuzhal* are the words in the southern parts of the country. Besides the confusion of the term *been* applied also for *veena* (in Hindi and other Indo-Aryan languages), it is worth noting the significant relation of two names ; *nagasvaram* refers also to the double reed wind instrument, a counter part of the *shehnai* and the European oboe. Similarly *mahudi* is obviously related to *mohari*, *mori*, *mahuvari* and *madhukari*, all double reed instruments like the *nagasvaram.* Is it possible, one wonders, whether *nagasar* (*nagasvaram*) and the *mohori* were generalized to all beating reed wind instruments ? That the *nagasvaram* has probable ethnic relation to the community of snake charmers (*garvdi*, *sapera*) is only too evident. *naga*=snake, *svara*=sound ; what is also possible is the transference of the name to double reed instruments in south India.

Whatever be the differences in name, the construction is generally the same throughout the country. It consists of a small calabash which serves as an air reservoir and to which are attached reed or bamboo pipes. At the top there is one tube inserted into the gourd. This is a simple open flue into which the snake charmer blows. The air collects in the bottle gourd and passes out through two pipes fixed at its lower end. Each of these has a single beating reed and gives out the sound ; but one of them acts only as a drone and the melody is played on the other. In recent specimens one may come across a long metallic tube, besides the two bamboo ones. This also function as a drone. (Fig. 7.17)

An instrument which can be considered to be of the same family as, if not an improvement over, the *pungi* is the *tarpo* or *tarpu* found in Gujarat and Maharashtra. Here, instead of a small gourd, a larger variety (*doodhia bhopla*—Marathi) is used as the air chamber. The blowing is done in two ways : (*a*) end blown, where the top of the gourd is cut off and blown into,

(b) side blown, where a hole is made in the side of the air reservoir and blown into, with a small tube often inserted in the aperture to act as a mouthpiece. As in the *pungi* there are two single reed pipes having three to five holes inserted into the gourd at the lower end. Further the tubes have a common funnel of wound palmyra (*tad*) leaves, called *karna* in Marathi, which acts as a sound radiator. Incidently, it may be suggested that the name of the instrument is itself derivable from *tad*, the leaves of which are used in making the funnel. There are two kinds of the *tarpo* : the medium size is known as *ghogha* (Marathi) and the larger one, sometimes of about two meters length, as the *khongada* (Marathi). In Gujarat, the smaller variety is often calted the *dobru*. While in Gujarat it is found among the tribals of Balsar and Surat districts, in Maharashtra it is typical of the Vorli people. The months of *Bhadrapad* and *Asvin* (about September to October) when the rice is ready for reaping Vorli lads and lasses gather to dance to the accompaniment of the *tarpo* ensemble and competitions of *tarpo* playing are held. (Fig. 7.18)

Very much like the above in construction is the *masak* of the north and the *tutti* or the *titti* of the south (*titti* in Telugu means a bag). This is the bagpipe of India. While in the *pungi* and the *tarpo*, the reservoir is of gourd, in the *masak* it is of leather. The kid of a goat is slain and its full skin is used as the air bag. At one end is a small pipe into which the player puffs the air which passes out of two bamboo or cane tubes, each having a single beating reed. As with the *pungi* one of the pipes is a melody pipe having about six holes, and the other is the drone. (Fig. 7.19)

b. While in the single reed wind instruments one flap beats against an immovable part of the body of the tube, in a double reed aerophone there are two reeds—made of palm, cane, reed and so on—called as *patti* (Hindi, Marathi), *aku* (Telugu), *seevali* (Tamil), *peepi* (Kannada). The pair of reeds which act as valves are fixed to a metal tube which is inserted into the funnel-shaped hollow body of the instrument. The length of the main pipe may be from about 25 cm., as in the *sundri* or the *naferi*, to nearly 90 cm., as in the *bari nagasvaram*, and there are usually seven playing holes. Besides these seven, four or five auxiliary ones may also be made, normally on the side opposite to the playing holes to adjust the pitch of the instrument. This is done by closing one or more of them with wax. As in the flute, these wind instruments do not have keys for playing. Western aerophones of this class as well as the clarionet possess levered mechanisms which close or open the orifices. But such an arrangement is a handicap for Indian music where fine distinctions of pitch (*sruti*) and graces (*gamaka*) are essential and only direct fingering can produce these.

The above is a very general description of this group which may be called the *mukhaveena* family. Depending on the size, construction and locality the names vary ; for example, the more common ones are *mukhaveena*, the *mohari* or *mori*, the *nagasvaram* or *nayanam* and the *ottu* (the last is employed only as a drone), of the southern peninsula ; upper India has the *shehnai*, the *surnai*, the *mohari*, the *tuti*, the *naferi*, the *sundri* and so on. Sometimes the word *kahale* is also used as in Karnatak. While normally the player uses only one instrument there seem to be cases where a pair are held together and blown simultaneously.

It is not certain whether the family of double-reeds is 'Indian' or 'foreign'. Like many other instruments it is perhaps both, as will be seen from what follows.

Mukhaveena (a *veena* played with the mouth—*mukha*) is mentioned by Somanatha of 12th-13th Century A.D. in his *Pandita-aradhya charitra* (Telugu) as also the Karnatak king Mummadi Chikka bhoopala of the 17th century in *Abhinava Sangeeta sara.* It also occurs in some Telugu ballads attributed to a 14th century writer.

Naagasvara or *nagasara* is referred to in Sreenatha's *Kreedabhiramam* (Telugu, 14th century), Singiraja's, *Singiraja puranam* (Kannada, 15th century).

Of greater interest and significance is the *mohori* which Is a tribal and folk oboe. It is also known as the *mori*. And here it is suggested that *word* is related to *mahudi* and *magudi*, the snake charmer's single-*reed* pipe of south India and that the *word* had been Samskrtized to *madhukari* and *madhukali*.

Perhaps the earliest reference is in Matanga's *Brihaddesi* as *mavari* and *madvari* (6-9 century A.D.). Other works in which this instrument is mentioned are by Nanya (11th century), Sarngadeva (13th century), Vema (14th century) and Chikka-bhoopala (17th century). The Kannada poets, Raghavanka (13th century) in his *Harishchandra kavya*, Singiraja (15th century) in *Singiraja puranam* and Govinda vaidya (17th century) in his *Kantheerava Narasaraja vijaya*, give it as *mouri* ; but the Kannada poet-saint-musician, Purandara dasa, uses also the term *mourya* in his *suladi*-s (which were long compositional types, each section having a different *tala*).

A few suggestions on the etymology of this word may be offered here. *Madhukari* is said to be 'corrupted' to *mavari* ; and *madhukari* itself is derived from *madhu*=sweet and *kari*=one which makes, and hence a sweet sounding instrument. This is perhaps carrying Samskrtization a bit too far. However, it is possible to derive from or relate to this word another, viz, *mori* which means a gutter, a channel or a tube. This is the common usage in Kannada, Marathi and Hindi. Hence, a tubular instrument is '*mori*' or '*mohori*'. Compare this to *sushira vadya*, wherein *sushira* literally means 'hollow'. See also *kuzhal* to be discussed below.

Mohori known in many areas, as a folk instrument, is somewhat similar to the *shehnai*. But the *mohori* found in Assam is very different. It is made of bamboo, in three sections which are detachable, the middle one having six holes. The Khasis of Assam have the *ka tangmuri* ; the *muri* in this word is also significant.

A linguistic parallel to this is the word *kolavi* in Dravidian, meaning a tube. While *kolalu* in Kannada and *kuzhavi* in Tamil refer to both a tube (any tube) *and* a flute, the Kotas of Nilgiri have the *kuzhl*, the Irulas of contiguous regions have *kol* and Kerala has *kurun kuzhal*, all of which are oboes (double reed instruments). Thus, like the *mori*, a word meaning a tube is generalized to all tubular instruments—flutes and oboes.

Olaga is another word used for *nagasvaram*. *Olaga*, in Kannada, generally means a gathering or the court of a king. It also means the ensemble of musicians in the court or a procession. Since the oboe is a prominent instrument in this, it is itself called *olaga*. This is exactly parallel to the *melam* which means an ensemble as well as a *nagasvaram*.

The *gnyaling* is an instrument of this group found in the northern hills. It resembles the *shehnai* and is about a meter in length. Here also the etymology is revealing. *Ling* in Tibetan refers also to flute and one can see the parallel in *kuzhal*. *Gnya* means either China or India. For example : *gnya-nag* = China, *gnya-chock* = Chinese table and *gnya-gar* = India, *gnya-tam* = Indian rupee. It is therefore very probable that this instrument went to Tibetian areas either from India or China ; hence it is a 'foreign' (*gnya*) 'tube' (*ling*).

Whether the *instrument shehnai* was imported into India from Central or West Asia is not certain ; the *word* certainly was. Other instruments related to this one are the *sundri* and *naferi* which are small sized oboes. The former is found in Maharashtra and the latter in the Gangetic valley. Literary references to these occur in Hasan Nizami's *Taj-ul-Masir* (12-13th century) and in the writings of Nizami Ganjavi of the 12th century. Sreenatha, the Telugu poet (14th century) in his *Palnati veera charitra* mentions *sannayi* ; *naferi* finds a reference in the Telugu ballad *Katama raju katha* whose hero is dated 1170 A.D, though the written text of the ballad is of the 17th century. It is thus possible that the *shehnai* and *naferi* reached south India by some time before the 12th century. The *shehnai* was known at the time of the Hindi poet, Krishnanand dasa (16th century) and Ahobala in his *Sangeeta parijata* gives *sunadi* which may be the same as the *sundri*. *Surnai*, may, perhaps, be the older name and the instrument itself is used in Central Asia and in the Slavic countries where it goes under the name *zurna*. Hasan Nizami

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and Nizami Ganjavi do give *nafir* and *surna* (*surana*). *Surnai*, *zurna*, *sundri*, *sunadi* and *shehnai* are closely similar not only in structure, but the linguistic relations are also evident. *Nai* means a tube and it has been suggested that the *shehnai* is a compound of *shah+nai* : this would mean that it is an instrument for the kings (compare *olaga*) or the 'king of instruments'. It is worth examining whether a derivation such as *sur+nai* is possible.

Notwithstanding so much textual evidence, an historically parallel evidence in sculpture and painting does not occur. There is a stray relief of the Gandharan period (3rd century A.D). The Veerabhadra temple in Asandi, Karnataka (early 13th century) and a temple car in south India (18th century) show specimens of *nagasvaram*. But the north Indian miniature paintings from the 16th century onwards abound in depictions of instruments of this kind.

All the instruments of this family have the same basic structure and technique of playing. Their differences lie mostly in their sizes, and certain minor details.

The basically functional parts are two :

1. *The reeds* : These are two small reeds held together, leaving a small gap between them. The reeds are fixed to the tube of the instrument, either directly or by means of a metallic staple.
2. *The tube* : This is the main body of the instrument and is the resonator. It is conical in shape, narrow near the blowing end and opening out gradually. Usually. there is metallic 'bell' at the farther end. The tube is usually of wood, but may be of metal also. *Nagasvaram*-s of silver, gold and even soap-stone are known.

There are seven holes along the tube. They are used for playing, closing or opening them by fingers. In the *nagasvaram*, there are five holes along the bottom. These are not used for playing, but for adjusting the basic pitch of the instrument : one or more of these can be plugged with wax and thus raising or lowering the fundamental pitch of the instrument.

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Like the flute, the *mukhaveena* species is found from the tribal to the sophisticated concert music. Essentially these are outdoor instruments of religious and secular ceremonies, and are also considered auspicious, particularly in south India where temples honour and maintain *nagasvaram* artistes. The *shehnai*, similarly, are employed by royal houses in upper India to announce and welcome the dawn and the dusk. Within the last two decades, however, these instruments have been brought to he concert platform and enjoy a 'high' status. [Figs. 7.20, 7.21]

3. FREE REED AEROPHONES

The wind instruments so far described (air-reed, lip-reed and mechanical-reed) had one principle in common ; the air by its own vibrations was the cause of sound. Its mass, length of column, etc. determined the pitch. The reeds acted as valves and were controlled by the mass of the air column in the tubes. But there is a group of aerophones where wind pressure sets into motion a reed and the pitch of the sound is determined by the length, mass and tension of this reed, but not by any coupled air mass. In the previous group of instruments the air-length was adjusted by closing and opening of holes (analogous to stopping the string on a fret) ; that is, there is one tube with a number of holes (comparable, roughly, to one string and a number of frets). These statements comparing the air column to the length of a string are only very approximate ; the actual mechanics are more complicated. But in the instruments to be studied presently there is one reed for every note (like the harp having one string for each note) and the air, as it passes across the reed, makes it vibrate, to give the desired tone.

The *peepi* of south India and the *boli* or the *piperi* of Rajasthan are some of the simplest examples of the free reed. The former is a child's toy and the latter is used by puppeteers. Two flat pieces of bamboo, about 7 to 8 cm. long and a centimetre wide, are held face to face with a stretched rubber band or thin blade of leaf placed between them and tied at the ends.

The contraption is held in the mouth and blown into ; as the breath passes across the rubber or leaf strip a curious rasping or fluttering sound is produced. While we have mentioned only southern India and Rajasthan, the instrument is really common throughout the nook and corner of this country.

The more developed instruments of this class have a free reed, that is a thin and flat lamella, usually of brass, which moves within an aperture in a metal frame. This reed does not touch or beat against the body of the frame (hence the term 'free reed') but is screwed or rivetted to one edge of the hole. The vibration of the metal piece is comparable to that of a rod fixed at one end. For this reason one may even think of classifying this kind of instrument with the idiophones, for according to the principle already stated, the criterion of taxonomy is to rely on the primary sound producer. Nevertheless, the instrument has been included here as the sound production is very closely related to the air movement and in deference to the traditionally expected classification.

The most widely known and used free reed aerophone in India is the harmonium, though the popular ones are also the mouth organ and the accordion. All these have been imported from the West and the harmonium was perhaps introduced into this country in the late 19th or the early 20th century. The mouth organ is even now mostly a children's instrument. The accordion, popular with film musicians, brass bands and, of course, the rock'n roll genre, has become a favourite with a section of the younger generation within the last decade. The harmonium, however, finds a place in the music of all kinds—folk, light, dramatic and even the highbrow.

The free reed is supposed to have gone to Europe from China, via Russia, in the latter half of the 18th century. The Chinese instrument was *sheng* (Japanese-*sho*). The *sheng* consists of a wooden air chamber with a projection for blowing. Into the airchest are inserted thirteen or more reed pipes, the lower end of each, pushed into the windchest, bearing the single free reed ; the tubes themselves are arranged in a semicircle. Another type found in Laos and Burma has no wind chamber like the *sheng*. But a hollow wooden body, into which the player blows is pierced through by a set of pipes each bearing a free reed. The tubes in this mouth-organ are tied together, one beside the other, to form a raft.

A similar but simpler, nevertheless very sweet sounding, instrument is the *khung* of Manipur. The proximity of Manipur to Burma and Laos is significant : for it is quite possible that the *khung* either migrated from India eastward on to China or was received by our country from the eastern nations. The body of the instrument comprises a small gourd (as in ancient *sheng*) to the neck of which is attached a cane or bamboo tube used for blowing. The calabash acts as an air reservoir into which are fixed six cane pipes, in two sets of three each. Every one of them has a free reed, the end bearing the reed being hidden in the reservoir. While ancient *khung*-s *might* have had bamboo or cane slips as the vibrating tongues, the current ones have metal reeds. There is a small hole on the side of each tube. When the player blows he has to close the aperture of that pipe which he wants to sound. If this is not done, enough pressure is not built up in the flue to vibrate the reed. Almost all the playing tubes carry bamboo or fruitshell caps to muffle the sound. (Fig. 5.15)

It is said that Emperor Nyu-kwa of China (third millennium B.C.) invented the mouthorgan, though the first mention of *sheng* is taken to be in 100 B.C. and the earliest picture of 551 A.D. One Johanan Wilde (18th Century) obtained, at St. Petersburg (Russia), a Chinese mouthorgan. From him the principle of free reed was adopted by Western instrument makers in the 19th Century. Many types of reed organs, accordions, and harmonicas have since then been developed. And with the coming of Western traders, soldiers, religious proselytizers and musicians, also came the harmonium to India. (Fig. 7.22)

The basic and functional parts of a harmonium are two : the reed and the air bellows. The first is the real tone producer ;

the latter with all its attached valvular mechanisms produces and controls a current of air under pressure.

The sounding part of the harmonium is a set of reeds, one for each note. The reed is made of brass, consisting of a frame with an oblong shallot. Moving in this gap is a thin metal tongue, the reed, which is fixed at one end and free at the other. Till recently high quality reeds were imported from France and Germany ; but nowadays good ones are produced in India, particularly at Palitana in Gujarat.

When the bellows are worked, air gets compressed in the wooden box below the reeds. The pressurised air is allowed to go across a reed by opening a hole under it. This is done by depressing a key on the keyboard which action moves a valve at the opening under the reed. On the opening of this valve, air rushes past the reed making it vibrate and give the required tone. When the finger is lifted off the key, a spring brings it back to its original position and the aperture below the reed gets closed.

The influence of this instrument on Indian music and its suitability have been subjects of controversy—often fierce and ulteriorly motivated. To understand and evaluate its inadequacies as well as adequacies, if any, it is proper that we recognize two very essential aspects of *raga* ; indeed, these form the bases for the finest musical experiences and express the genius of the melodic music of India. The two are : *sruti* and *gamaka*.

It is not necessary here to enter into detailed musicological discussion on the nature and number of *sruti*-s. But it is very evident to any one with some degree of auditory sensitivity that the 'same' 'note' finds different psychoacoustic values in different *raga*-s. For example, the *dhaivata* in *Jaunpuri* and *Bhairav* (Hindustani) is unquestionably distinct. Again the *nishada* is intoned, by certain schools of north Indian musicians, slightly higher in *Yaman* than in *Pooriya.* Notice again the characteristic use of two separate *suddha gandhara*-s in the Karnatak *Todi.* It is the experience of every musician that the same 'note' acquires different, but recognizable, pitches in ascent and descent. All these and more are pitch distinctions of "hair breadth", so very basic to our music. Can a harmonium provide the facility for obtaining such delicate shades ? Not ordinarily. Even the best of such instruments are tempered and the very manner of their tuning prevents the production of these *sruti*-s. Even if one could get a harmonium constructed to one's key, a twelve-tone-to-the-octave keyboard would still be inadequate. Attempts are now being made to build *sruti* harmoniums, some of them electronic. They have to come to the market to be used and tested.

The other fundamental ornamentation, *gamaka,* can also not be elicited from this keyboard instrument, Glides, swings or any other decorations to tones which require continuous transitions are impossible on the harmonium. How can one get the best of *Kanada* without its beautiful swing (*andolan*) on *gandhara* ? The slow glides of *kheyal* or *dhrupad* or the finer *gamaka*-s of Karnatak music cannot ever be produced on harmonium. At best one can get a staccato music, out of tune, from this instrument.

It is for these reasons and its racuous sound that Rabindranath Tagore called the harmonium the "bane of Indian music". The All India Radio has banned its use, though recently there is a strong pressure to allow it in broadcast. No serious Karnatak musician will touch it, though Hindustani musicians have accepted it to some extent. If at all it can produce any good music, it can only be of a staccato type with steady tones ; and, if very well tuned, it can even develop a style like the harp. Yet it has spread like wild fire into villages, into the less discerning musical strata and even to serious concert music of north India. The reasons seem to be : first its volume—it can be heard far away and hence used by folk musicians ; secondly no tuning is necessary—if one could close one's ears to its inaccuracies of pitch, it is extremely convenient. Neither the player nor the listener need exert themselves on this score at all. !

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Chapter VIII

TATA VADYA (CHORDOPHONES)

Instruments using stretched strings—be they of grass, animal gut or metal wire—present some of the most baffling problems in organology. Their fast development, variety in construction and technique make the study of their evolution and change a very difficult task ; and their role in the growth of music and musicology is also profound.

The origins of chordophones are difficult to trace. One of the commonest assumptions is that the earliest stringed instrument was the hunter's bow. Certainly the twanging of the bowstring could have suggested its use as a tonal adjunct to rhythm. The *villadi vadyam* has such a use and its very name (*villu*=bow) indicates its shape and, perhaps, its parentage. We may also remind ourselves that the most ancient chordophone of the Tamils was a *vil yazh*. Again, the fact that the early instruments were harps constructed in the form of a bow lends support to this idea ; for a harp can easily be imagined as a bow with a number of parallel strings. This close resemblance between the musical instruments and the weapon is recognized in the *Ramayana*, wherein Ravana exclaims, proclaiming his prowess as a bowman, "Rama has never fought with me ; therefore he does not know of my valour ; *when I will play the veena of my bow with the plectrum* (*kona*) *of my arrow*, when my bowstring will sound, when the terrorised enemies will scream, when the noise of my arrow will be heard and when I shall plunge into the river of my foes, then neither Indra, Varuna, Yama nor Kubera dare face the rain of my arrows".

While there is a strong possibility of the bow being the source for harps and the lyres, it is illogical to posit its parenthood for fingerboard instruments. Indeed, it is impossible to imagine how a bow can be stretched to tube which, obviously, is the essential part of a fingerboard. Yet, many Indian scholars to this day put forward this idea of the bow as the originator of *all* stringed instruments.

There is one primitive instrument, however, which has missed the attention of most organologists : and that is what is often called the "bamboo zither" or "tube zither" by Western scholars. There is no common Indian name for this, though it is found in many tribes as for instance the *ronza gontam* of the hill Reddis of Andhra and the *gintang* of Assam. The 'chordophone' is made of a bamboo tube. The skin of the bamboo stem is spliced longitudinally to some length. Without detaching these strips from the body at the ends, they are lifted off the tube to a little height by means of two bridges. The raised epidermal threads form the 'strings' and are beaten with a thin stick. Similar instruments can also be found in Orissa, Malaysia and Indonesia. (Fig. 8.1)

This, I think, is the simplest form of zithers from which most of the latter instruments can be derived. The *gettu vadyam*, for instance, is only a sophisticated version of this. Stroking the 'string' leads to rubbing as in the *ekatantri*, *gottu vadyam* and the *vichitra veena*. I may even suggest that the very idea of stroking and rubbing could have led to bowing which is a finer method of the same process. Also, the sound of the instrument is increased in volume by tying a calabash to the bamboo tube. If one considers the modern northern *veena* (*Rudra venna*) one can certainly see that it can be developed from a kind of *gintang* by attaching to it resonating gourds and the frets. It is even more possible that chordophones like the *svarmandal* and the *santoor* find their primitive beginnings in such bamboo zithers. If instead of one or two strands of the skin, a number are cut and lifted, one gets the prototype of the *svaramandal*. One has only to imagine a number of *gintang*-s tied together like a raft to get such a polychord. Such an instrument is actually found in Assam where it is called the *dendung*. (Fig. 8.2). When the strips of the epidermis are replaced by guts or wires, and the bamboo tubes by wooden boxes we have the *santoor*, *svaramandal*, *qanoon* and such like.

There is also not much doubt that the early types of stringed instruments were the harps and the lyres. Right from the Indus valley inscriptions till about 11th century A.D. we come across visual representations of harps of some kind or the other. While they have completely disappeared in concert and folk music, the *gogia bana* of the Rajgonds is a sole survivor. It is also clear that fingerboard zithers existed side by side with these even from the time of Bharata. For he mentions the *ghoshaka* as a minor chordophone. This is identified by later authors as *ghosha*, *brahma veena* and the *ektantri*. A very early picture of such a zither may be seen in Ajanta ; but later sculptures and paintings show greater details.

The harps were gradually displaced by fingerboards instruments of various types and today we have but a couple of polychords. Only the *svaramandal* and the *santoor* and the rare *gogia bana* remain. This emergence of zithers and lutes has an immense significance in the unfoldment of music and it will be worthwhile discussing this at length.

Contribution to the evolution and the theory of music :

No other class of instruments have affected the dynamics of music as the chordophones. Indeed, it is almost a truism to say that without musical instruments there could have been no grammar of music. If they had not been 'invented' and developed, we might have not been in a position to measure and work out the relations of notes and scales. Besides, they have profoundly influenced and directed the way which the art of music has travelled. We have already seen the function of the flute in this kinetics : but, doubtless, stringed instruments have played an even more crucial part. Of these we shall examine two aspects :—

1) Emergence of the drone and the shift of the standard scale :

Round about 14th to 16th centuries there is a vast change in our music which, it is unfortunate, has not received as much attention as it should. This change directly relates to musical scales and is linked with the development of musical instruments.

To go into the nature of these changes, it would be necessary to study the process of formation of musical scales and their dynamics of integration. We shall, however, restrict ourselves to only one factor, that of the drone.

It seems necessary for the establishment of a tonal 'reality' or tonality that there should be a point of reference. This is the tonic which when externalized acoustically is the drone. It is the nature and function of this drone (and tonic) which will give us a clue to the changes in the standard or *suddha* scale in our music.

For psychological and neurological reasons suggested elsewhere, the tonic in early music is the top note and not the middle as we now have. For a 'primitive', music is an integral part of his communal life and is not a specialized activity. He sings when he is tense with affective state ; it rarely is the meditative music of the more sophisticated man. So his pitch goes up first and then descends as his affective state returns to normal. In short, his music is a descending one. This is a common characteristic of folk music and also, it may be noted, of *saman* chant.

In such descending music it is usual to find that relations of fourth (*madhyama bhava*) are important. That was why, it was said by our ancients that *Ma* is *achala* (nonvariable).

In ascending music *Sa* is the fundamental and tonic. It is *achala* ; so also is its *panchama*. *Ma* in such music is always variable, having *teevra madhyama*.

This basic difference between descending and ascending music is reflected in the emergence of *Bilaval* scale (major diatonic) as *suddha* scale in Hindustani music and we may examine this phenomenon now.

The more sophisticated a society, the more specialized its various activities tend to become. Music, which was always associated with dance, rituals and festivals, becomes 'pure' music with us, Music does not have that quality of 'bursting forth'; it grows from note to note, deliberately and slowly. It does not start with a shout. Therefore, unlike 'primitive' music, instead of starting high and ending on the tonic, it *starts* and *ends* with the tonic. That is, such a sophisticated music is an ascending one. In immediate relation to this is the fact that instrumental music is also ascending : a flautist produces a scale by opening one hole after another and a lutist by moving his finger closer and closer to the bridge, hence decreasing the string length.

This transition seems to be first noted in the *Naradi siksa* (1st c.) where the equation between the *saman* chant (descending) and the flute scale (ascending) is given. The whole transition seems to be over, in our music, by the time of Ramamatya (15th c.) when there is no distinction between *Sa-grama* and *Ma-grama*. (This is a sure indication that a universal tonic has been established.)

If we consider a *veena* or *sitar* string and try to arrange the ancient *suddha* scale (natural or standard scale) we get some such diagram as shown below :

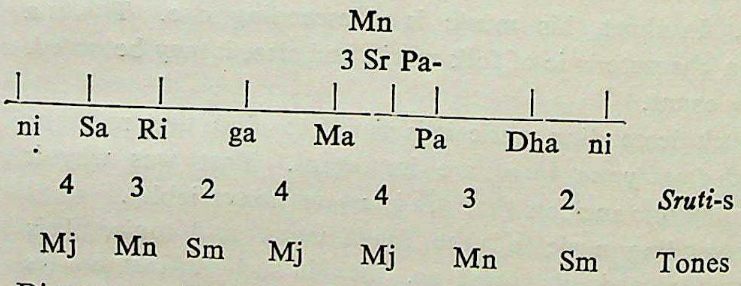

Diagram 1. The placement of the two *grama*-s on a single string.

That is, in the ancient *suddha* scale, *ni* being the 'lowest note' in the octave and *Sa being on the forth sruti*, the latter is *not represented* by the *open string* in the diagram.

In ascending music, *Sa* is the first and the lowest note in the octave. This, therefore, must be *open string*. Hence, in the above diagram if *ni* (open string) is treated as *Sa*, we have

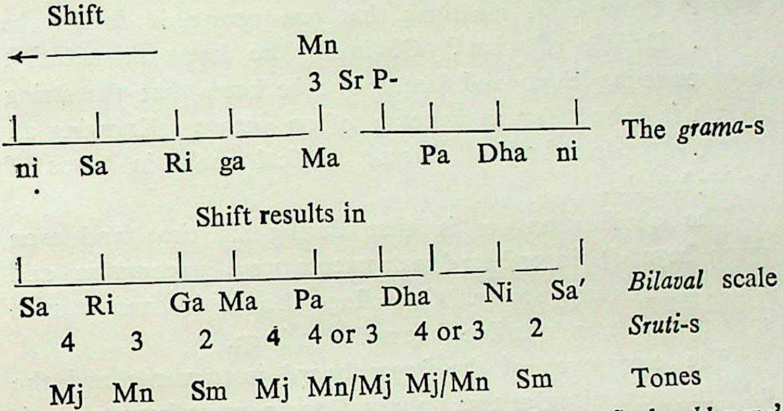
Shift
Mn
3 Sr P-
The *grama*-s
ni Sa Ri ga Ma Pa Dha ni
Shift results in
Bilaval scale
Sa Ri Ga Ma Pa Dha Ni Sa′
Sruti-s
4 3 2 4 4 or 3 4 or 3 2
Tones
Mj Mn Sm Mj Mn/Mj Mj/Mn Sm

Diagram 2. The placement of the '*Bilaval*' or '*Sankarabharana*' scale on a single string due to downward shift in the scales of *grama*-s.

The difference in both the *grama*-s will only be in the *Dha*; but, either of them is close enough to modern *Bilaval*.

Since ascending music will start from *Sa*, as the lowest note of the octave and also as the tonic, the open string must be *Sa* and not *ni*; for, the lowest note from a string is produced when it is open. Therefore, on a finger board instrument the standard scale derivable from the ancient *grama*-s will be the *ni-moorcchana* which gives us *Bilaval*.

The psychological dynamics of this change from descending to ascending music has been discussed elsewhere. We here note that this change implies :

1. The establishment of the lowest note as the universal tonic.
2. Hence the corollary that there are no more *grama*-s.
3. *Sa* and hence *Pa* become *achala*. This is mentioned explicitly only by Ramamatya and others after him.
4. Finger-board instruments (with the advantage of the open string being the tonic) become more popular. Harp type of instruments disappear.
5. *ni moorcchana*, i.e., *Bilaval becomes the standard or suddha.*

In this connection it is worth noting that till Ahobala's time (17th c.) scales are never given in terms of string lengths! Why? Sarngadeva mentions that one octave is double the other. Double of what? Obviously he knew the relation between string length and frequency: he knew that the string length is halved for an increase of an octave. Knowing all these, why does he not discuss musical scales in terms of string lengths.

The obvious answer is that during his time (and even much beyond), finger board instruments were uncommon and harps were more popular. On a finger board instrument such measurements are possible, but not on a harp.

The emergence of the finger board instruments and the establishment of *Sa* as the universal tonic must have necessitated a standardization of the then current musical scales in north India. As pointed out above, the new correspondent scale for the ancient first *moorcchana* would be *Bilaval.*

Thus *Bilaval* assumes the position of the standard or *suddha* scale, superseding the ancient *Mukhari.*

This process might have taken centuries—right from before *Naradi siksa* (1st c.) upto the 16th c. Only at beginning of the 19th century, from the time of Pratapa Simha Deo and Mohammad Rezza, is this finally and explicitly accepted: for they are the first musicologists to treat *Bilaval* as standard.

2). Measurement of intervals :

Bharata, one of the earliest scientific minds in Indian musicology, describes two experiments on the *sruti* and from his description it is obvious that he was using *harps* and not finger-board instruments. His first experiment defines the *pramana sruti* or the standard minimal interval. He says, "that in the *Madhyama grama,* the *panchama* should be lowered by one *sruti* by loosening of the string". The difference between the *panchama*-s by tensing or slackening the string is the measure of *pramana sruti.* In modern terminology this interval is equated to the difference between a major tone and a minor tone : that is comma diesis. (4-3=1 *sruti* ; 9/8÷10/9=81/80.) The extension of this experiment is that of the *chatusvarana* or the 'fourfold tuning'. Two harps, identical in all respects—construction, tuning, plectrum (*vadana danda*), pitch, and even the player form the apparatus. The two are tuned identically, twentytwo strings in each (one for every *sruti*), to the *shadja grama*. One of these shall be called the standard or nonvariable (*dhruva*) harp (*veena*) ; the other shall be the variable *veena* (*chala veena*). Now, reduce the pitch of the *panchama* in the *chala veena* by one *sruti* such that it has the value of the *panchama* in *Madhyama grama* ; then reduce all the other strings in this *veena*, so that every one of them is one *sruti* lower than the corresponding note in the *dhruva veena*. That is, in effect the *chala veena* is now in *shadja grama*, but totally lower in pitch, in comparison to the standard *veena*, by one *pramana sruti*. This is the first *sarana*. The strings of the second harp are again lowered by one *sruti* ; it will be found that its *nishada* and *gandhara* correspond to *dhaivata* and *rishabha* of the *dhruva veena*. This is the second *sarana*. The third step is once again a lowering of the *chala veena* by a *sruti*, bringing its *dhaivata* and *rishabha* to the same pitch as the *panchama* and *shadja* of the standard instrument. Finally, the process is again repeated, bringing the *panchama*, *madhyama* and *nishada* of the *chala veena* to the *madhyama*, *gandhara* and *dhaivata* of the *dhruva veena* respectively. This classical experiment has been one of the most discussed in Indian musicology ; but it is certainly a landmark in the definition of the ancient musical scale.

Another significant method, again using a harp, was that of Sarngadeva (13th Century). A string is fixed on a *veena* (harp) in such a way that it can produce its lowest pitch. Now tune another string slightly higher. But it must be so close to the first in pitch that a third tone cannot be introduced between them. Similarly tune a third string just higher than the second, so that there cannot be another tone between the second and the third ; the process is continued thus. The strings so tuned are said to be, consecutively, one *sruti* apart. It is clear, therefore, that, according to Sarngadeva, *sruti* is the just noticeable difference pitch. In current scientific language a *sruti* is the *difference limen* for pitch.

Lastly, the *veena,* this time a fingerboard one, is used to define the musical scale, Hridayanarayana, Ahobala and Sreenivasa (all 17the Century) give the string lengths for various notes ; in fact for all the twelve notes. This is a very important fact, the meaning of which is yet to be grasped by Indian musicologists. It is a pointer to the emergence and stabilization of the drone in Indian music, which matter was touched upon in the previous section.

This has also a close relation to the fretting of instruments. The earliest fretted chordophone we so far know of, in India, was the *kinnari* of Matanga. Matanga (7th-9th A.D.), who was himself an expert in the *chitra veena* (a harp), is said to have 'invented' the *kinnari* having three strings and fourteen to eighteen frets. However, sculptural evidence shows that fretted instruments might have become popular by about the 8th Cent. A.D., for the earliest such evidence, till now traced, is from Pattadakal (Karnataka) reliefs of about 750 A.D. ; the first mention of frets, perhaps, is by Nanyadeva (11th Century). The Samskrt word for the fret is *sarika* and some, therefore, deduce that the early instruments of this nature had moveable frets, as we now have in the *rabab* and the *sitar* ; the immoveable frets are supposed to be a much later innovation.

We may here discuss the question of fretting in the development of Indian scales. To comprehend[1] the significance, it is necessary to understand the limitation of the harp in melodic music. In such a chordophone, each string sounds a note and that too a steady one. It is impossible to get any *gamaka* out of it. Also even slight variations of pitch are not producible on the string once it is tuned. A fingerboard instrument has none of these disadvantages and can follow the voice closely. A little deflection or a small pressure can give the minute pitch change so essential in melodic music. But it is also convenient to fix places where the notes of the scale can be got and where these pitch distinctions of a fine degree can be obtained. These positions are indicated by frets. It is of great musicological interest to see that in the Persian system the word *parda* is employed for a note and in the Urdu usage, at present it refers to a fret.

This set of frets is nowadays called *that* in Hindustani music, and probably the first Samskrt text employing this term was Ahobala's, *Sangeeta Parijata*. The corresponding Samskrt word is *mela*, originally put into currency by Vidyaranya (14th Century). *Mela* is also considered equivalent to *samsthana* of Lochana and the *maqam* of the Persians. It has, so far, been found convenient to have twelve frets at suitable positions in the octave. While, In Indian music, this has never meant a twelvetone mean temperament, it has yet provided a twelve-tone nomenclature—seven *suddha* ('natural') and five *vikrita* (variants). The earliest to give a dodecatonic scale was Nandikesvara much prior to Bharata and his idea was reiterated by Matanga ; but one is not certain whether this implied the later concepts of twelve-tone scales, for the medieval theory of *mela* meant the absence of *grama*-s and *moorcchana*-s. The logical conclusion of this was the seventytwo *melakarta* scheme of Venkatamakhi (1620 A. D.) which is the basis, in some form or the other, of later classifications of gamuts and *raga*-s. It is once again to be emphasised, therefore, that the present arrangement of notes within an octave is really the consequence of the psychology of the drone and the emergence of finger-board instruments, particularly the fretted ones.

Classification :

The taxonomy of stringed instruments herein adopted is based on the following criteria. First, is the differentiation into polychords and monochords. These terms are employed in a special sense here. 'Polychords' are those wherein every note is played on a separate string—a string for a note. To this class belong harps, lyres, psalteries and dulcimers.

'Monochords' are those wherein all notes of an octave and even melodies can be got on one string. Depending on the mode of excitement we have the struck, the plucked or the bowed; further divisions are made on the basis of musical functions, fretting and other details. The classification herein summarised in the accompanying table naturally depends on instruments observed in India.

IV CHORDOPHONES

IV. 1. RUBBED CHORDOPHONES

IV. 2. POLYCHORDS

- A. *Bow-type*
  - i. **Struck**
  - ii. **Plucked**
    - a. lyres
    - b. harps
- B. *Box type*
  - i. Plucked
  - ii. Struck

IV. 3. MONOCHORDS

- A. *Struck*
- B. *Plucked*
  - i. **Drones and rhythmic**
  - ii. **Melodic**
    - a. Zithers :
      - a′. without frets.
      - a″. with frets
    - b. Lutes :
      - b′. without frets
      - b″ with frets
- C. *Bowed*
  - i. **Upright**
    - a. without frets
    - b. with frets
  - ii. **Inverted**

1. RUBBED CHORDOPHONES

These are some of the most primitive 'stringed' instruments, because the sound produced has a vague hum and the manner of operation is also extremely simple. Often the excited material is not even a 'string', in any way comparable to those in other chordophones.

Two instruments of this class have been noticed, the *baghra* of Orissa and the *nar hunkarnio* of Rajasthan. Essentially, in both, there is a pot the mouth of which is covered with parchment. Passing through the bottom of the vessel and the skin is a thin gut as in *baghra* or the rib of a peacock feather as in the *nar hunkarnio*. The pot is held between the feet and the chord is rubbed *longitudinally* with fingers wetted with water or smeared with resin.

One could hardly call these as musical instruments ; as a matter of fact, they are really implements to scare off birds and foxes from fields.

2. POLYCHORDS

The family now to be studied, the polychords, are characterised by the fact that each note has a separate string for its production. This arrangement naturally has a few limitations. First, of course, is the fact of tuning. This has to be accurate and once a string has been tuned not much variation in its pitch is possible. Secondly, no *gamaka* or glide can be elicited, to the extent that Indian music requires. Since only steady tones are obtainable, this class of instrumens as a whole is inadequate for melodic music, and this might have been one of the reasons for its disappearance from our musical world.

Polychords may be further separated into two types : bow and box, each could again be of two varieties : plucked and struck.

A. (i) *Villadi vadyam* of Tamil Nadu is the best example of a bow shaped struck string. Perhaps, organologically there is an anomaly in including it in this class. For it is not a *poly-chord* ; it has only one rope which is struck and no melody is produced. However, in shape it resembles the others in this genus , also one can conceive of the whole genus—harps, lyres inclusive—as being derivable from a bow, the *villadi vadyam* having one string and the others many. It is for these reasons that the instrument has been included here.

The instrument itself comprises a large bow (*villu*), nearly two and a half meters in length, across which is tied a rope or a leather thong : and from the bow are suspended large jingle bells. The rope of the bow is beaten with a pair of sticks (*villadi kole* or *veesu kole*) by the main singer. A resonator in the form of an earthern pot is used : but it is separate from the bow which is only rested on it. It is usual for another singer to beat rhythm with a palmyra leaf bat on the vessel. A group of vocalists act as a chorus, using rhythmic instruments like *udukkai*, *cymbals*, *kattai* (long wooden clappers) and so on. The song sung is called *villu pattu* (song of the bow) in Tamil and is a folk song, either a ballad or a religious discourse. (Fig. 8.3)

(ii) Polychords of the plucked variety. of the bow type, dominated the scene of Indian music for centuries. Right from 3000 B.C. to about 11 Century A.D.—a span of nearly four millennia—these instruments were the most important and have generally been called *veena*. And herein is an organological difficulty : for *veena* is a word of such a wide application and we meet it also in aerophones. The *mukhaveena*, for instance, is a double reed wind instrument. Among the chordophones there are the *vipanchi veena* (harp), *satatantri veena* (dulcimer), *ravanahasta veena* (bowed), *kinnari veena* (fingerboard, plucked), and so on. Indeed the hand (palm) used as an indicator in *vedic* chant is called a *hasta veena* : an inaudible instrument. Again the voice is the *gatra veena*. But when the terms is used without any specific prefix it refers only to chordophones, specially the plucked ones : however Indian organology has not so far recognized distinctions within this class. Such a differentiation has been attempted in the present work.

The linguistic and etymological relations are here pointers to intercultural ties as well as, probably, migrations of peoples and instruments. It is no accident that the Samskrt *veena* (cf. Hindi *been*) is closely similar to the Egyptian *beent*, the Japanese *biwa*, the Chinese *p'ip'a* (both lutes) and the Sumerian *gisban*.

a. It is doubtful whether India ever had any lyres at all. As far as can be made out from the usual evidence available from sculpture, polychords of the country were all harps. However, one of the Indus Valley incriptions shows a shape which looks very much like a lyre. The figure is highly stylized and one can but only surmise that it might have represented such an instrument.

b. Harps of various kinds are definitely the major category of chordophones of ancient India. As already mentioned they were all classed as *veena*-s, usually with specific appellations. The difficulty is again one of lack of detailed descriptions in texts and general literature, in many cases. This makes any identification—whether as harps, dulcimers or psalteries—doubtful.

Once again excavations at Mohenjodaro and Harappa have brought to light seals and pictographs of harps. In shape they are like bows and the number of strings vary from three to four. There are neither resonators nor pegs. (Fig. 8·4).

The *vedic* age had a number of *veena*-s, like the *vana* (*bana*) the *karkari*, the *kanda veena*, the *apaghatila*, the *godha vaena*. We have no clues to reconstruct the correct shapes and sizes of these. It is supposed that the *karkari* might have had the *karkari* fruit as a resonator and that the *godha veena* was one covered with *godha* (iguana) skin.

The *veena* was a very popular accompaniment both in sacramental and secular music, as well as a part of the music of marital rites. The *veena* players—*veena ganan* and *veena gathi*—were prominent in rituals and were perhaps sacrificed in certain ceremonies like the *Purushamedha* : among the persons sacrificed were also the flutist, the singer, the conch blower, the trumpetier (*kahala vadaka*), the *dundubhi* player ; and the maker of the cloth for the *veena*. Besides the special *veena* players, the wives of the *udgatha*-s accompanied the singing on the instrument.

The *vana* was the most venerated of all, for it was also called the *mahaveena* and is known to *vedic* text as well as to the *aranyaka*-s and the *sootra*-s. According to the *Boudhayana sootra* it was made of *audumbara* wood, the resonator covered with the hairy hide of ox. The stick of the harp had ten holes into each of which were threaded ten strings of *munja* grass, thus making a total number of one hundred. Of these 33 were fixed by the *adhvaryu*, 33 by the *hota*, 33 by *udgata* and one by the *grihapati* or *yajamana* ; the *vana* was struck with *venu kanda* (a piece of bamboo). If this were taken as correct, the *vana* should be placed with struck polychords.

Modern writers have tried to identify this instrument as a precursor of *santoor* found today in Kasmir. The suggestion is that it had one hundred strings and could have been the *satatantri veena* (*veena* with 100 strings) mentioned in the *Kalpasootra* ; Katyayana, the author, however, uses the word *vana* and gives the number of strings as a hundred. Further, it is also suggested that the *satatantri veena* is linguistically related the *santoor* ; again both the *vana* and the *santoor* are played with sticks, though it is not certain whether these sticks were employed to pluck or strike the string in the ancient instrument. In the absence of any sculptural representation of struck *veena*-s, particularly of the box type, and in view of the description of the *vana*, it is doubtful whether it could have been a dulcimer like the *santoor*. The same argument applies to its having been like the *katyayani veena* kept in the museums at Calcutta and Trivandrum. Indeed, the former collection has two entirely differently shaped *katyayani veena*-s !

While Bharhut shows *veena*-s of five strings the more wellknown one was the seven stringed harp. The *Jataka*-s speak of the *saptatantri veena*. The popular story in the *Gupitila Jataka* runs thus :

"Once upon a time, when Brahmadatta was reigning in Banaras, the Bodhisatta was born in a musician's family. His name was Master Gupitila. When he grew up, he mastered all the branches of music, and under the name of Gupitila the Musician he became the chief of his kind in all India…

Musila (the (chief musician of Ujjain) entered the Bodhisatta's dwelling ; he saw his (Bodhisatta's) lute where it stood tied up : he took it down and played upon it. At this the old parents (of Bodhisatta) who could not see him because they were blind cried out.

"The mice are gnawing at the lute ! Shoo ! shoo ! the rats are biting the lute to pieces !"

At once Musila put down the lute, and greeted the old folks… He asked where the teacher was…Musila sat down and waited until he came…. Now the Bodhisatta was skilled in divining from the lineaments of the body. He perceived that this was not a good man ; so he refused (to accept Musila as his pupil)…(finally) he did as was asked….

Now the Bodhisatta did not stint his knowledge, but taught his pupil everything which he knew himself.

(Bodhisatta) came before the king and said "My pupil is wishful to serve your highness. Fix what his fee shall be"… The king said, "If he is as perfect in his art as you, he shall receive the same as you do"…. The pupil consented to the bargain ; and the king being informed of this, replied, "Very well. What day will you compete together". "Be it the seventh day from this, O King", (said Musila).

The Bodhisatta thought within himself, "This Musila is young and fresh, I am old and my strength is gone…. If he beats me, death in the woods is better than the shame which will be mine portion." So to the woods he went, but he kept returning through fear of death and going back to wood through fear of shame. And in this way six days passed by. The grass died as he walked, and his feet wore away a path.

At that time, Sakka's throne became hot. Sakka meditated, and perceived what had happened…. So he went in haste and stood before the Bodhisatta…. Then said the Bodhisatta, "I was in fear of being worsted by my pupil, O King of the gods; and therefore did I flee to the woods." (And he said :—

"I had a pupil once, who learnt of me
The *seven-stringed* lute's melodious minstrelsy ;
He now would fain his teacher's skill outdo.
O Kosyia ! (Indra) do thou my helper be !" The Sakka said
"Fear not, for I will help thee at thy need ;
For honour is the teacher's rightful meed" (and continued)

"As you play, you shall break one of the strings of your lute, and play upon six ; and the music shall be as good as before. Musila too shall break a string, and he shall not be able to make music with his lute ; then shall he be defeated. And when you see that he is defeated, you shall break the second string of your lute and the third. even unto the seventh, and you shall go on playing with nothing but the body ; and from the ends of the broken strings the sound shall go forth, and fill all the land of Banares for a space of twelve leagues."

(And so it came to pass)

It is clear from the story that *veena* was a harp and certainly not a lute, as the translator gives.

The seven stringed harp seems to have existed in other varieties, at least in name. There was the *parivadini*. The *chitra* was even better known and mentions of it are found in the *Ramayana* and the *Mahabharata*. In Bharata's time the *chitra* was, along with the *vipanchi veena*, one of the major instruments. We do not get many details of its construction ; but this much is known that it was played with the fingers. Early sculptural evidence of the heptachordal *veena*-s can be traced back to as early as Bharhut, *Pitalkhora* (2nd-3rd Century B. C.), Amaravati (2nd-3rd Century A. D.) and so on. The gold coin with the figure of Emperor Samudragupta (330-370 A. D.) playing such a harp is by now famous. Musically it is obvious that the seven strings were tuned to the seven notes of the ancient scale which, in current terms, will be Sa, Re, ga, Ma, Pa, Dha, ni. (Fig. 8·5).

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The *vipanchi* which is referred to in the *Ramayana* and the *Natya sastra* was a nine-stringed harp. Further there is a definite statement of the fact that it was played with a *kona* (plectrum) which as seen in various reliefs was a piece of wood. The *vipanchi* was perhaps tuned to the ancient standard scale, with the addition of *antara gandhara* and *kakali nishada*. (Fig. 3.1)

The *veena* of Narada was the *mattakokila* or *mahati* with twentyone strings covering three octaves.

While these are the more important *veena*-s, one comes across the names of various others ; but descriptions are either absent, scant or confusing. In any case, a general idea of these—what may be called the Indo-Aryan—has been presented. There is an important class of harps of the ancient southern culture we should not forget. These were the *yazh*-s, descriptions of which are to be found in old Tamil works. Whether these were entirely different in structure as well as nomenclature from the *veena*-s is difficult to determine. Some derive even the word *yazh* from *jya* meaning bow string ! There is also a stanza in the *Tiruppalliyezhucchi* of Manikka Vachakar (9th Century A.D.) which says, *inter alia*, "*veena* players on one side and the *yazh* players on the other", which, according to some, indicates that the two instruments were different.

While there might have been variations in the details of the shapes, the sizes and the number of strings, these ancient chordophones were perhaps constructed on a basic form. This consisted of the hollow resonator, the cover on it, the arm and the strings. The larger and the heavier part of the *veena* or the *yazh* was the *ambhana* or *doni* (*pattar* in Tamil). The belly was either fully or partially covered with hide (*charma*—Sanskrit, *porvaittole*—Tamil). To the resonator was attached a curved *danda* (*kotu* in the *yazh*), ending in a scroll (*siras*—Sanskrit). Passing from within the hollow body, through the holes in the parchment to the arm were the strings, varying in number, and these were of twisted grass (*munja*) or animal gut. The latter is evident from the Tamil word *narampu* (gut). It is more or less certain that these *veena*-s never had any pegs ; for in the illustrations there is no peg and the strings are directly tied to the *danda.*

The only surviving instrument of this class is the *gogia bana* of the Rajgond tribe of Andhra. The resonator is hollowed out of wood and covered with skin ; from it projects a *dandi,* on to which are tied five strings. They are plucked with a *khoonti* (plectrum) of castor wood.

B. i. Polychords with strings in the horizontal plane, placed over box resonators are very rare in India. Sculptural and other visual evidence is almost non-existant and one can only speculate on the basis of pointers in nomenclature.

Kallinatha (15th Century) in his *Kalanidhi,* the commentary on the *Sangeeta Ratnakara,* says that the *svaramandal* was the popular name for the *mattakokila.* Was this a box-polychord ? We have no unequivocal proof, but in Sarngadeva's time it was an important stringed instrument, throwing the *vipanchi* and others to the background.

Today the *svaramandal* is a *trapezoid* box-polychord. The resonator is of wood and the dimensions are : length : 50 cm., breadth : 35 cm. and height : 3 cm., the other sides being oblique. On it are about forty strings of metal of different lengths, stretched on two ledges. These strings are fastened to metal pegs which are turned for tuning. The instrument is tuned to give the notes of the *raga* being rendered and plucked by means of wire plectra worn on the fingers. There are very few who play regular music on the *svaramandal.* It is nowadays more a fashion to strum it along with one's singing. While good quality pieces are manufactured here, the best ones are imported from abroad, specially from Germany. (Fig. 8.6)

The Midwestern *quanoon* is a corresponding instrument with a box on which are fixed twenty-six sets of three strings and these are plucked by wire plectra. The *Arabian Nights* has a reference to this in the story of Bakkar and Shams al-Nahar, as the *quanoon,* though in Greek it went under the name of *kitara.*

ii. The *santoor* of Kashmir is the sole sample of the struck polychord. As pointed out earlier, the *satatanri veena* is often identified with this intrument ; the evidence, however, is both insufficient and equivocal. The fact that even to this day it is confined to the north western corner of India, Kashmir, as well as its wider spread in the contiguous areas of Asia shows that it must have originated in these parts of the world ; and the name *santoor* or *santeer* is said to be derived from the Armaic. The instrument now in existence in our country is a wooden trapezoid box, 60 cm. long, 60 cm. wide on one side and 30 on the other. There are thirty bridges, fifteen on each side, over each of which passes a set of four metal strings. As with the *svaramandal*, the strings are fixed to iron pegs which can be turned for tuning and the strings are struck with two sticks bent at the striking ends. (Fig. 8.7)

MONOCHORDS

Monochords, as defined here, are those instruments in which a melody can be produced on one string. That is, there is no one-to-one correspondence between notes and strings ; in other words, there is no 'one note'-'one string' relation. All the required pitches are produced on one chord. This is achieved by altering its length—moving a finger, a piece of wood or metal along the string ; by increasing its tension—pressing and deflecting. 'Monochord' does *not* imply an instrument having one string : indeed, there may be many. However, even *one* is enough to play a tune.

The great advantage of such a mechanism of tone production is the continuity of sound. Whereas polychords can play mainly staccato, monochords can give a continuous flow of sound, glides and graces like the voice. Again, an open string always forms the drone and strengthens the melodic organisation. This has already been discussed above.

Probably the earliest monochord was of the *gintang* type. Striking, plucking and bowing (quite possibly an extension of stroking ?) give rise to the different families of this class. Obviously, again, the non-fretted fingerboard instruments were prior to the fretted one ; also striking and plucking might have been more ancient than bowing.

While the hunting bow and the bamboo zither are two sources from which chordophones could have developed, there is another which is also worth nothing ; and this is the groundharp. So far no examples of this have come to light in India ; neither are there any illustrations or textual references. It is a native of central Africa. Like the bow, this is reminiscent of the spring snares employed to catch small animals. The instrument comprises a pit in the ground covered with bark. On one side of this is a flexible wooden pole dug into the earth. This pole is bent over by means of a stretched string, pulled and attached to the bark. This cord is struck or plucked by one or more players. Now, Sachs has suggested that this ground harp could be the precursor of instruments like the *ananda lahari* (*gopi yantra*). The first step in this 'evolution' is "freeing from the ground". He cites the case of the Annamese *cai dan bao*, "an instrument played by women and blind people, is supported by the player, but is too heavy to be carried while played. The pit of the ground harp is replaced by a rectangular, wooden sound box. A flexible rod stands upright near one end of the box, and a wire string is tied from the upper end of the rod to the other end of the box. The string is plucked. When the rod is bent slightly nearer to the box, easing the tension, the plucked string can produce lower notes". The further stage is to make this portable. The resonator box is made small enough to be carried and played by one person. This portable chordophone is exemplified by the *gopi yantra*. It is here that we may derive and group various similar instruments like the *tuntina*, the *bagilu*, the *prem tal* and others. These are all plucked chordophones, in the opinion of the present writer, and *not* plucked membranophones as some have suggested, though they may have different musical functions.

Functionally string instruments can be of three kinds ; rhythmic, integrative, melodic. The first type is confined to the task of giving and emphasising the temporal quality of music.

As discussed elsewhere, the instruments employed for such purposes have, in the main, to produce sounds of short duration. If they employ strings, they can but be mainly of the plucked or the struck variety. Of such a kind are the *gintang*, *gettuvadyam*, *prem tal*, *gopi yantra* and so on. The integrative instruments are the drones. I have called them so, as the drone acts as a melodic foundation and integrator. Such instruments do not produce any tune but give only the key note. To this category belong the *tuntina*, the *ek tar* and the *tamboora*. Naturally, the two types overlap and they may be employed for one or both the purposes. The third group of chordophones are melodic. Here the function is to create a melody or a *raga*. They may, of course, be capable of producing rhythm and the tonic ; but they are not put to such uses. However, any instrument may have rhythmic and integrative adjuncts. The *veena*, the *sitar*, the *dilruba* have the *sarani* or the *chikari* which gives the basic notes as also the *tala*.

A. The simplest and the most primitive struck monochord found in our country is the type like the *gintang* of Assam. Similar instruments are used in Orissa and in Andhra where it is called the *ronzagontam*. This bamboo zither is idiochordic ; that is, all components of the instruments are of the same material viz , bamboo. (Fig. 8.1.) (Instruments like the modern *sitar*) the violin, the *veena* and so on which are made of different substances are called as heterochords.)

There is, however, a more sophisticated struck monochord the body of which is made of wood : the *gettu vadyam* of the southern areas of the country. This is a small instrument of about 80 cm. overall length and 25 cm. height. There are two resonators ; one large and the other small. The bigger resonator projects into a neck which continues onto a long thin fignerboard. The flat top of the big bowl bears a small wide bridge on which pass two pairs of metal wires. These go on over a ledge and then onto the pegs ; they are tuned to *Sa* and *Pa*. The player squats on one side, with the *gettu vadyam* on the ground in front and beats out the *tala* on the strings with thin bamboo sticks. A staccato melody can also be produced on this instrument. (Fig. 8.8)

B. (i). As used in India, plucked instruments can be divided into two broad classes : the non-melodic and the melodic. The former includes chordophones which are only drones and rhythm keepers ; the second group comprises all those on which melodies can be and are produced.

The simplest examples of drones are the *tuntune* or *tuntina* (south India, Maharashtra) and *bagilu* (Gujarat), used in folk music. The resonator consists of an open wooden or metal cylinder about 15 cm. in height and 10 cm. in diameter, the lower face covered with a parchment. To the outer side of the cylinder is nailed a wooden rod, about 100 cm. long, the further end of which bears a single peg. Passing through the centre of membrane onto the peg is a single wire of steel which is plucked to give the tonic. (Fig. 8.9)

A variant is the *gopi yantra* or *ananda lahari* found in the eastern parts of the country, specially associated with the wandering Vaishnavite minstrels, the *baul*-s. The instrument has a cylindrical wooden resonator as in the *tuntune*. However, instead of a single wooden rod affixed to the side, a split bamboo is nailed to it, by the forks. Connected to a peg at the top and passing out of the membrane at the bottom of the cylinder is a string of metal or animal gut. The string is plucked, but at the same time the bamboo fork is pressed and released, which process pulls up the parchment to minute degrees. This, in effect, decreases the tension of the gut, altering its pitch and giving beautiful tonal-rhythmic variations. (Fig. 8. 10.)

Another kind is the *ek tar*, a constant companion of mendicant singers. The name as well as instrument is prevalent throughout the country, though in some areas, as in Mysore, it often goes by the appellation *eka nada*. Here the resonator is a pumpkin or a gourd, usually flat. A bamboo tube passes through it, projecting a little on one side. Tied to this small projection and passing over a bridge on the gourd to the distal end where it is fixed to a peg is a single metal string; this gives the instrument its name—*ek tar*. Usually there is no ledge near the peg. The *ek tar* is held in one hand and plukced by the fore-finger of the same hand, as in the *tuntune* and the *gopi yantra*. (Fig. 8.11)

Another example of this group is the *ramsagar* of Gujarat. Whereas the *ek tar* is small (about 110 cm in length), this Gujarati folk instrument is much bigger—almost double or more in size. The construction is the same in both, but the *ramsagar* has two strings, tuned to *Sa* and *Pa*; curiously enough, even this sometimes is referred to as the *ek tar*, though it has a pair of strings. The present author has come across such muddled nomenclature, even in the case of ordinary *ek tar*-s where two strings have also been noticed.

A further stage in the construction of the drone is found in the *tamboori* of Andhra and Mysore; in the latter region it is also called the *chikka veena*. (Rajasthan has similarly the *chau tar*.) Structurally different from but musically more advanced than the drones described earlier, the instrument is scooped out of a single piece of wood. The resonator is bowl shaped and continues into a short neck and the hollow fingerboard. The last ends usually in a serpent or a *yali* motif. It is more common to have the finger-board made separately and joined to the neck, in the cheaper varieties. The bowl (*koda*—Kannada) and the neck are covered with one plank and the fingerboard with another. There is a small wooden piece at the lower end of the bowl to which are tied four metal strings. These pass over a wide bridge on the *koda*, onto a ledge and then to four pegs. The tuning is usually Pa_1, *Sa*, *Sa*, Sa_1. The instrument is portable and can be seen on the shoulders of beggars, mendicants and pious monks as they go about singing songs of heroism and piety from village to village. (Fig. 8.12)

The concert *tamboora*, both in the south and in the north (where it is known also as the *tanpoora*) is only a sophisticated version of this rural instrument. (Fig. 8.13) The construction is again the same essentially. The resonating bowl is made of wood in the southern variety, but in upper India it is of a large pumpkin (*tumba*) ; these gourds are best grown near Pandharpur in Maharashtra (though large quantities are imported from Zanzibar) and since the most renowned makes are from Meeraj in the same State, this kind of *tanpoora* is often known as the *Meeraj tanpoora*. Whereas in the southern *tamboora*, the resonator (*kudam*—Tamil, *koda*—Kannada) and the neck are carved out of the same block of wood, in the *tanpoora* a wooden neck has to be made separately and attached to the gourd. The rest of the instrument is more or less the same in both ; however, the southern *tamboora*-s are much smaller than the northern ones. *Meeraj tanpoora*-s have the gourd of nearly 70 to 90 cm. in girth and overall height of 105 cm. to 120 cm. The strings used are : one of brass for Pa_1 or Ma_1, two of steel (Sa, Sa) and one of steel (Sa_1).

At the lower end, the strings are fixed to a piece of wood, the *langote*, struck to the gourd. From here they pass ever a bridge (*ghoda* or *kudirai*) to a notched ledge (*meru*) and then through the holes of another ledge to the pegs. The pegs are two on the front and one of each side. While these are turned for grosser tuning, finer pitch adjustments are made by the sliding of beads, one for each string, near the lower end.

Functionally the most important part of the *tamboora* is the wide bridge. Made of ebony wood (*seesam*), ivory or camel bone, it is curved in a direction right angles to the strings and sloping in the direction along their length. The whole bridge is made of one piece and stands on two broad legs ; each of these bears a small hole into which fits a protrusion from the covering plank (*tabakdi*—Hindi, *palakai*—Tamil). C. V. Raman had earlier shown that it was the slope of the bridge which was the cause of the beautiful tone of the instrument. As the present author was able to demonstrate, the placement of the fine thread of cotton, silk or wool under each string, on the bridge, was even more important than the grazing contact of the string with the bridge, as it is the reason for the fine tonal modulation and the rich sound of the *tamboora*; for besides a large number of harmonics it makes possible the production of inharmonics which are musically useful. Indeed, the wide bridge and the *jeeva* (*jeevali*) thread are amongst the most creative contributions of India to world instrumentation.

Before concluding this section on the stringed drones, particularly the *tamboora*, we may discuss briefly a few related psychological phenomena which have been studied in great detail elsewhere. The part played by the tonic and the drone in melodic music is threefold :

First is the important fact that each tone, each group of tones, each relation of tones and groups are related to one psychoacoustic level—the tonic (which, when given a definite acoustic character, is the drone). Here is the importance of the tonic and the drone. It is necessary to emphasise that it is the *relationship* that is important and not the actual acoustical value of a tone. Further it must be pointed out that such a relationship of relationships is more fundamentally a psychological one and not one of respiratory convenience. In all this organization the tonic forms the base psychologically and when this gets an acoustic form, it is termed the drone.

Secondly, the tonic (or the drone) represents a state of tonus of the organism. An emotional state tends to make the organism tense and the organism always will tend to return to a state of rest or tonus. Parallel to this is the tonal movement. Any departure from the tonic engenders a state of tension which is resolved by returning to the tonic. Such departures—their extent and nature—may again be used as factors of integration, comparable to tonal distances from the drone (or tonic).

In harmonic music we find the same phenomenon of starting and finishing a musical piece on the same key. This method of musical composition, it is said, is being departed from in the twelve-tone (atonic) music of Arnold Schoenberg and his followers. This would be introducing new kinds of states of tension without resolving them acoustically. But, perhaps, the mind does find a rest after the music is over—a kind of post-tonic. This is a different problem, not immediately relevant to the present work.

Also, as shown previously these psychological functions of the drone seem to have exerted an extraordinary force on the development of our musical forms. Obviously, if the drone is so important in melodic integration, a musician cannot afford to shift his drone. It must be steady, *achala*. But yet, prior to about 14th-15th century, we do find a musical system with a variable *Sa* (*chyuta Sa*) and a variable *Pa* (*chyuta Pa*). But after Ramamatya this type of musical nomenclature disappears and the beginnings of the present system appear.

Thirdly, the drone provides a tonal background for a musician. Against this background each tone of the melody finds a relationship. Such a relationship may be pleasant, unpleasant, neutral or any other shade of affective tone. Such affective values are employed as the material for emotional tones of the melodies.

The present writer had earlier analysed the sound of the *tamboora* ; the preliminary result shows that when it was tuned as Pa_1, *Sa*, *Sa*, Sa_1, there are at least thirteen physical tones and the ear may modify these into fortytwo. Also the physical spectrum gives intervals : *Sa* : 1, *Re* : 9/8, *Ga* : 5/4, *Pa* : 3/2, *Ni* : 15/8 ; but inside the ear, these get changed into nineteen. Similarly, when tuned to Ma_1, Sa, Sa, Sa_1, the physical tones were thirteen and the aural fiftytwo ; the physical intervals were five (S*a*, *Ga*, *Ma*, *Pa*, *Dha* : 5/3) and the aural ones twentyone.

Finally there is the historical question—how old is the drone and how old is the *tamboora*. As for the drone, it could be as old as music, for it is but an externalization of the essential tonic. Any instrument with a degree of sustained tone can be and has been used as a drone. Among the chordophones those like the bow, the *gintang*, the *ekatantri* could have been the early drones, later developing into the *tamboora*. This last is recent ; at least pictorial evidence from miniature paintings shows it to be so, and places its popular use to about the 16th Century.

Its origin is usually attributed to the Middle East—Iran, Mesopotamia, Egypt. The reasons given are that (i) in India the *tamboora* is not found in 'literary or pictorial sources' to the end of Middle Ages, (ii) the ancient Greek instrument, Pandora, is supposed to have degenerated (?) into the Oriental *tamboora*. On the other hand, Pandora (not to be confused with Pandore) is said to be the same as the ancient Eastern plucked instrument *tamboora*.

Tamboora being an instrument from the Middle East is doubtful. According to Abdul Razak Kanpuri, the word *tamboora* is neither Persian nor Arabic but Indian. His '*Al-Baramika*' gives the Indian term as *tumba*, which in Iran was modified into *tumbura* and in Arabia into *tunbur*. There were many variations of the instrument *tunbur—darij*, *wanj*, *alakkaun*, *basuq*, *mashuq* ; *tunbur al mizani* was the Greek Kinarrha (Kinnari ?). From all this it is evident that the Middle-Eastern instrument *tunbur* (a fretted instrument) might have been most probably derived from Indian finger-board instruments.

Now the *Sangeeta Parijata* of Pratapa Singh Dev gives two types of *tumboora* (vide., Ch. II on musical instruments)—*anibaddha* and *nibaddha*, i.e., unfretted and fretted. The former one was also called the *tamboora*. The latter is the *sitar* ; this would, therefore, correspond to the *tunbur* of the Middle East. This also raises the question, 'Was the *tumburu veena* a drone (*tamboora*) or was it a finger-board instrument (*nibaddha*) ?'

There is a class of folk instruments, closely resembling the *tuntune´* but essentially rhythmic in function. These are the *prem tal* of upper India, the *chonka* of Maharashtra and the *jamuku* of Andhra ; similar instruments can also be found in the rest of India with local names. The resonator is a hollow bottle gourd, a wooden or metal cylinder. On one side of this open vessel is membrane of thin cleaned hide. Through the centre of this, held by a button, passes a long gut which can be held taut or loose by the hand holding the peg tied to the distal free end of the gut : there is no rod supporting the string as in the *tuntune* or the *gopi yantra*. The vessel is clasped under one arm, the string being held in the same hand by the pegs. A plectrum is used to pluck with the other hand and by small movements of the wrist holding the peg, tonal changes are created. The instruments are rhythmic, because the sounds emanating are vague and indefinite in pitch incapable of a sustained drone. (Fig. 8.14)

While the more developed and multistringed harps are melodic in function, there is a simple 'bow shaped' instrument which might be considered as a very primitive form of harp and is used for rhythm and as an 'indefinite' drone : the *buang* of the Santals (Orissa) in whose collective dances it is an important accompaniment. The instrument consists of a large bamboo tube with sticks inserted at the ends, the whole appearing like a bow ; a hempen rope is tied taut forming the 'string'. Beneath the bow and attached to it at its centre is a bamboo basket covered with paper festoons. This longish basket serves as a resonator. The player holds the bow in one hand, pulling and releasing the rope with the other in a fine rhythm, a booming sound emanating in accompaniment to the intoxicating dance of the tribal men and women. (Fig. 8.15)

(ii) Of the melodic fingerboard instrument without frets we may recognize two larger groups : (a) those which are neckless (zithers) and (b) those with necks (lutes).

a′. One such rare single-stringed instrument is the *tuila* of Orissa. Even in that region it is not common and there are not many players of this instrument.

It is simple looking and has a limited range. But what is very interesting is the method of playing the *tuila*.

The instrument itself is very unimposing in appearance. There is a *dandi* (the fingerboard) of bamboo, the length being that of the arm of the player. The circumference of this tube is about an inch.

At the lower end is a piece of curved wood, about six inches long, called *ghoda*. This is made of *gamri* or *ber* wood and is used for tying the string. There is no bridge as such.

The string is not parallel to the bamboo rod but, starting from the *ghoda*, goes in an inclined manner to the top where it is tied in a special way to the *dandi* itself, there being no tuning pegs.

The material used for the string varies with the season : *suta* (cotton) during the rains and animal gut or silken hemp in summer.

Tuila does not even have a nut at the upper end to hold the string. The thread or gut is brought into close proximity of the *dandi*, at the top, by tying two strings across it.

The instrument bears a small cut gourd as a resonator and the open end of this rests on the player's chest. When playing it is lifted off the chest slightly and pressed back which act gives the effect of 'muting'.

The most interesting part, however, is the fingering technique. Besides the ingenuity of the process, it is almost unique, though the whole method is geared for simple folk melodies.

The first and middle fingers of the right hand are employed for plucking the gut at the lower end, near the *ghoda*. The open string, on exciting, produces the tonic (*Sa*).

Three fingers of the left hand—first, ring and little—press the gut to produce the second, third and fourth notes of the gamut (*Ri*, *Ga Ma*). Now comes the most interesting step.

The left hand is not moved down unlike in *veena* and *sarangi*, to produce the other notes—*Pa*, *Dha*, *Ni* and *Sa'* (upper) ; it remains where it is and the same fingers are used at the same places.

A very peculiar technique is now brought into play : just before plucking the string with the middle finger, at the lower end, the base of the index finger is momentarily brought into touch with the string ; immediately, the string is plucked with the middle finger.

These are done so quickly that they appear simultaneous.

The effect is to produce *Pa* (fifth) on the open gut. When *Dha*, *Ni* and *Sa'* (upper) are required, this very process of plucking is employed and the left fingers press the gut at the positions of *Ri*, *Ga* and *Ma*.

Thus the whole octave is obtained by using only the open string and three positions of pressing (stopping).

Veena and violin players have a parallel technique of damping the string to produce the upper octave and playing the melody at two levels. (Fig. 8.16)

The *ekatantri* (not to be confounded with the *ek tar*, the drone), known as the *ghoshaka* to Bharata, is perhaps the best ancient example of this group. Depicted widely in sculpture, it has also been described in many texts as for instance Nanyadeva's, *Sarasvati hridayalankara* (11th Century) which refers to it as the *brahmaveena*, Haripala's, *Sangeeta sudhakara* (12th Century), and Sarngadeva's, *Sangeeta ratnakara* (13th Century). As Nanyadeva remarks, the minutest *sruti* differences can be obtained on this instrument and "Goddess Sarasvati Herself dwells in the *ekatantri*". Sarangadeva calls it the *original veena*. These remarks are significant, for they indicate the emergence of the drone and the fingerboard instruments as also the loss of the musical importance of polychords ; as already discussed, this has brought forth an immense change in the music and musicology of India.

The *ekatantri* was a long bamboo tube on which was tied a single string, and hence the name. It had a single gourd resonator. The bridge seems to have been wide and here we meet the early use of the *jeeva*, so common in the modern *tamboora*. The gourd was held against the chest (see *tuila*) and the string was plucked at the lower end. The melody was produced by moving a short bamboo piece, *kamrika*, on the string. Obviously fine pitch changes were produced by sliding the *kamrika* and/or altering its pressure on the string. It is evident that the *ekatantri* evolved out of instruments like the *gintang* and later developed into the *vichitra veena* and the *gottu vadyam* of today. (Fig. 8.17)

The *vichitra veena*, a concert instrument, consists of a long (about 135 cm.) wooden fingerboard, of width 10 cm. and depth 3 cm. and beneath this are screwed two large pumpkins. The player places the instrument in front, the two resonators resting on the ground. There is a wide bridge, usually of horn, over which pass six strings of metal—of steel and of brass ; these go over two ledges and then on to the pegs placed at the sides. They are the main playing string tuned to *Sa*, *Pa*, *Sa*, *Pa*, *Sa*, *Sa* (the last two are used as drones). The strings are plucked near the bridge by means of wire plectra (*mizrab*) put on the fingers and a glass ball is slid on them with the other hand. Besides the principal strings there are two wires, the *chikari*, tuned to *Sa* and *Sa'*, which serve both as the drone and for playing the fast progression called the *jhala*. Underneath the main string and the bridge are a set of eleven thin strings (*tarab*) which, tuned to the notes of the *raga* being played, act as auxiliary resonators. (Fig. 8.18)

Besides the *ekatantri* there were also the two-stringed *nakula*, the three-stringed *anavartya*, four-stringed *rajadhani*, the five-stringed *vipanchi*, the six-stringed *sarvari*, and the heptachordal *parivadini*. There is an evident mix up here ; far from the mere mention of the number of strings, it is not possible to know which of them were polychords and which monochords.

a". Zithers with frets are again characteristic of our country, though the lutes have replaced them to a large extent. For in most sculptures it is this kind of *veena* which is met with ; those with necks and fingerboards are rare.

Here again the *veena* can be conceived of as having come from the *gintang*. If we imagine a set of frets and a gourd fitted onto this primitive instrument we get a chordophone like the *kullutan rajan* of the Savaras. (Fig. 8.19)

By attaching one more gourd, a *kinnari* can be produced. The *laghu kinnari* mentioned by Sarngadeva might have been somewhat of this type ; it has a bamboo fingerboard with fourteen frets of the bones of an eagle or metal ones fixed with wax and two gourds. He also gives another *kinnari*, the *brihat kinnari* which had three gourds and three strings; this can be seen even today in various parts of the southern peninsula. (Fig. 8.20)

The present day *veena* (Hindi—*been*) of north India, often called the *rudra veena*, is obviously an improved and enlarged version of the *laghu kinnari*. Like the folk instrument, the *dandi* (fingerboard) is of bamboo and there are two pumpkin resonators. The bridge is also wide as in many instruments. The playing strings are four, turned to *Sa*, *Pa*, Sa_1, Pa_1; besides these there are two drone strings (*chikari*) on one side (*Sa*, Sa^1), and one similar on the outer side (*Sa*). The frets are straight and thin edged and fixed immoveably to the *dandi* by wax. The instrument is held close to the body, diagonally across it. This venerable instrument, sonorous in quality, was popular during the days of the *dhrupad* style of singing—16th to 19th Century—and was used to accompany it. But along with the *dhrupad* and the *pakhavaj*, it has fallen out of common acceptance and is seldom heard now. (Fig. 8.21)

The stick zither of the kind described above presents one of those unexplained problems in Indian organology. There is no doubt that along with the drums, particularly the barrel shaped ones with loaded membranes, this class of *veena* is typical of the country. It finds very wide references and illustion. But it is north India which developed it into a concert instrument and has almost lost it in the folk culture, except in uncommon examples like the *jantar* of Rajastan. In south India it does not seem to have attained the status as in upper India after about the 16th Century; yet it is more prevalent as the *kinnari*, in the interior villages. However throughout the country it has yielded place to the lute.

b. b′. The origin and spread of the lutes is yet another of those problematic areas in the organology of this subcontinent. It is not even certain that they had an Indian source at all and whether early instruments of this kind did not come into this land from central Asia.

Some of the earliest evidences of lutes come from Ajanta and Nagarjuna Konda. It is significant that these were regions of Buddhistic concentrations and seldom do we find any kind of lute in early Hindu iconography or other visual representation ; such representations are most often of the stick either type. It is quite possible then that while stick zithers were the major contribution of India, the lutes were imported into this country via Afghanisthan, Kashmir and Sindh from Central Asia.

What is enigmatic is that Bharata—who is dated anywhere from 200 B.C. to 400 A.D.—does not talk of any lute, though he must have been contemporary to the creators of Ajanta and Nagarjuna Konda ; he, however, mentions *en passan* the *kacchapi*. The main *veena*-s described in his *Natya sastra* could have only been polychords. Perhaps this very fact may lead us to date him nearer 200 B.C.

In general this *veena* had a pear-shaped wooden body covered with leather. The resonator was convex, more or less in the form of a tortoise-shaped shell. The body extended into a neck continuing into a fretless fingerboard. Sometimes this *dandi* bent backward near the end. There were five tuning pegs, three on one side and two on the other, holding five strings which passed over a bridge on the resonator. What was the name of the instrument ? Here again there is much speculation. Some have identified it as the *chitra* and others as *kacchapi*. While this short-necked lute is absent in concert music now, in folk music it is met with in some form resembling this 'Ajanta *veena*', as we shall call it. The *dotara* of the eastern areas as also other examples in north India have a close likeness to this instrument. (Fig. 8.22)

Closely related to this 'Ajanta *veena*' is the *rabab* of the plucked variety and the *ood* of the Persian and the Arabic world. This particular type has also a pear-shaped resonator covered with parchment. There is a neck and a short fingerboard without frets. The word *rabab* is sometimes derived from the Sanskrit *rava*—sound or to sound ; of course, this does not make clear whether this was the 'Ajanta *veena*' or the waisted *rabab* to be discussed below. A number of miniature paintings of Mughal times, however, do show *rabab*-s of more or less this kind and the *Ain-i-Akbari* does mention a six stringed *rabab*.

Another *rabab*, also plucked, is the one with a waist. This instrument, now found only in Kashmir, has a body not with a smooth outline, but with two constructions, one on either side. Besides, the body is deep and extends into a fingerboard. The resonator is parchment covered and bears a thin bridge. There are six strings for playing the melody, corresponding to which are six pegs in the peg box. Usually there are about eleven sympathetic strings (*tarab*) and one *chikari* used as the drone. The instrument is held across the body of the squatting musician and played with a wooden plectrum. A very interesting feature is a set of four guts tied across the fingerboard, looking like frets. They are loose enough to be moved, but also fairly tightly tied. (Fig. 8.23)

A near cousin of the *rabab* is the *sarod*, one of the leading concert instruments of Hindustani music today. While its resonator is not as shallow as in the 'Ajanta *veena*', it is not as deep as that of the *rabab* either. But like the latter it has a deep waist. The sound box, the neck and the fingerboard are hollowed out of one piece of wood. Whereas the belly is covered with skin, the fingerboard, which is completely fretless, is covered with polished steel. There are four melody strings tuned to *Sa*, *Pa*, *Sa*, *Ma* ; besides these there are four more tuned to the dominant notes of the *raga* and two *chikari*. The *tarab* may comprise from eleven to fifteen strings. A 'triangular' plectrum (*java*) of wood or ivory is used for plucking the strings which are pressed on to the *dandi* with the balls of the fingers. (Fig. 8.24)

The *gottuvadyam* of south India is another concert instrument of this group ; it is also called, by some, the *mahanataka veena*. In shape and size it is exactly like the *Sarasvati veena* of Karnatak music ; even the constructional details are the same.

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However, there are no frets at all and the melody is produced by sliding a piece of hard wood or ebonite, called the *kodu* on the strings ; and hence the name *gottuvadyam*. What is peculiar is the presence of a set of seven sympathetic strings which are invariably absent in Karnatak chordophones. Like the *vichitra veena* it is kept on the ground and played. (Fig. 8.25)

b. Here is another group of lutes which probably were imported from Persian and Central Asian sources. As suggested earlier the major contribution of India to the stringed instruments of the world were the zithers, though the lutes have replaced them and have now become characteristically Indian. Of notable interest are the wide and sloping bridge as in the *tamboora* and many other plucked fingerboard instruments, sometimes with the added *jeevan* or *javari* thread.

While the *sitar* (and the *surbahar*) which dominates the northern scene might well be foreign, the southern *veena* of today might have had evolutionary links with instruments like the *nandurini* to which we shall turn later.

The *sitar* is, however, probably related to the *pandore* and the *tamboor*. The lute has been noticed in "Mesopotamian figurines, plaques and seals from about 2000 B C." It was the Greeks who called it *pandoora*, which word is derived from the Sumerian *pant-ur*. The *tamboor* of Arabia is a similar lute with a pear-shaped resonator and a long fretted neck-fingerboard. The persian word for this is *tar*, *du-tar* (two stringed), *seh-tar* (three stringed) and so on. It is to the last of these we may trace the name *sitar*.

Indian organology also recognized a three stringed instrument : what the *Sangeeta ratnakara* calls the *tritantri*. It is, however, doubtful whether this was a lute ; it could have been three stringed zither.

Today, Kashmir has the *sehtar* or the *saitar*. About 100 cm. in total length, it has a small pear-shaped sound box which extends into a long fingerboard. The resonator is covered with a wooden plank as are the small neck and the *dandi*. There are seven strings corresponding to seven pegs, placed frontally and laterally. As in the *rabab* there are gut frets which can be moved. (Fig. 8.26.)

There is no doubt that the concert *sitar*, now internationally known, is closely related to this, both in structure and name. The difficulty is in tracing this name and the instrument to pre-Islamic ages, though some have attempted to show the early Indian origin of the *sitar*. As noted above there was a three stringed chordophone, the *tritantri* : but was it in any way like the *sitar* ? Tradition often attributes the 'invention' of the instrument to Ameer Khusro (13th Century) ; but none of his writings refer to it. Also Abul Fazal, Akbar's chronicler, does not list a *sitar* player amongst the court musicians, in his *Ain-i-Akbari*. The popularity of this instrument, then, is a recent one.

The instrument is a long-necked lute, made entirely of wood, except the resonators. At the lower end is a gourd which is the main sound box. From this projects a neck extending into a long fingerboard which may often bear a small hollowed pumpkin at the upper end, acting as a secondary resonator. On the *dandi* curved frets of metal are tied by means of gut at proper places to suit the scale of the *raga* being played ; they can be moved when necessary. There are five metallic strings passing over a wide bridge on the cover-plank of the lower *tumba* (gourd) and along the fingerboard. They are tuned as Ma_1, Sa_1, Pa_1, Sa_2, Pa_2. While these are used for playing the melody, there are two more (*chikari*) tuned to *Sa* and Sa^1 ; these are employed for playing a melodic progression called the *jhala*. Underneath the frets runs a set of thin wires (*tarab*) tuned to the notes of the *raga*. Whenever a note is struck on the principal string, the *tarab* wire of this note begins to vibrate, the extra resonance enriching the sound of the instrument. The addition of *tarab* is typical of many concert and folk and stringed instruments of north India ; except the *gottuvadyam* no other southern instrument has it. (Fig. 8.27)

The *surbahar* is a particularly larger variety of the *sitar*.

Besides the difference in size we may also note that the gourd resonator at the lower end is flatter and the frets are sharper and thinner than in the *sitar*. By its very structure, this instrument is more suitable for *alap* and rarely, if at all, is a fast rhythmic piece played on it.

The historical study of the south Indian *veena* (very often called the *Sarasvati veena*) of today is even more perplexing. For there are no intermediate links between the primitive lutes and the modern *veena*. Nor is it easy to connect the Central Asian *tamboor* to this instrument, though both are lutes with necks and long fretted fingerboards.

It is quite possible that the *Sarasvati veena* is a highly modified form of the *nanduruni* which is seen even today in Kerala. Nearly 80 cm. long, this small instrument is made of one piece of wood, the belly and the fingerboard forming one unit. They are covered also with a single wooden plank. The resonator has a small wooden bridge over which pass two or three strings of animal gut ; and on the fingerboard there are three fixed frets of wood onto which are pressed the strings held by pegs. As a speculative idea it may be suggested that the current south Indian *veena* might have resulted from the adaptation and fusion of the principles of *nanduruni* and the Central Asian lutes. (Fig. 8.28)

Traditionally it is supposed that the *Sarasvati veena* was the creation of the king Raghunath Nayak of Tanjavoor (17th Century). The instrument consists of a bowl, neck and the fingerboard. In *veena*-s of high quality all the three are scooped out of one log of wood—usually jackwood—and hence known as *ekanda veena*. But in ordinary lutes, they are separately made and joined. The fingerboard (*dandi*) is long like a shallow gutter, with a curved bottom. The bowl (*kudam*), the neck and the *dandi* are all covered with a flat wood ; the covering on the resonator usually has two sound holes. The wooden bridge (*kudirai*, meaning a horse ; compare the word *ghodi* in Hindi and other north Indian languages), which is wide and covered on the top with a thin lamina of brass, stands at the center of the *kudam*. Besides this main bridge and attached to it there is also an auxiliary metallic one onto a side. Four strings, tuned to *Sa*, *Pa*, Sa_1, Pa_1, pass over the principal bridge ; one end of each string is fixed to a thick wire of steel, called the *langar*, which in its turn is attached to a metallic frame at the end of the bowl. The other end of the string passes over a ledge onto a peg. Over the auxiliary bridge run three strings, the *sarani*, tuned to *Sa*, *Pa*, Sa^1. These also have *langar*-s and are stretched from the lower end of the bowl to special pegs at the side. While gross tuning is done by turning the pegs, finer tuning is achieved by moving up or down a small metal coil on the *langar*. It is only on the four main strings that melody is played, the right fore and middle fingers being used for plucking and the left fingers for pressing the strings against the frets. The *sarani* strings, flicked by the right little finger, give the drone and the *tala*. There is a special way of fixing the frets (24) which, unlike in the *sitar* and the *Rudra veena* are neither concave nor sharp edged. They are straight, fairly flat and wide. Further they are embedded in a layer of wax applied to two ledges on the fingerboard, so that they stand out fairly high. The *dandi* itself ends in a peg box which culminates in an animal head, the *yali* ; there is an additional gourd resonator below the *dandi* at this end. In current practice, the *veena* is held almost horizontally, the main resonator resting on the ground and the gourd on the thigh. (Fig. 8.29)

C. BOWED CHORDOPHONES

The origin of bowed instruments has been a controversial subject. Various sources are attributed to them : Scandinavia, India and Persia. A number of scholars believe that Al-Farabi's mention (c. 950 A.D.) of the *rabab* of the bowed variety is the earliest reference, Also the "hemispherical-chested viol" of Ibn al-Faquih (962-3 A.D.) is suspected to be the *kamancha* of Egypt and Sind. (The *kamayacha* is even today found in Rajasthan.)

On the other hand, the *Sangeeta makaranda* of Narada (7th Century A.D. ?) mentions an instrument *Ravani* which, according to some, might have been a bowed instrument, though different from the *Ravanahasta veena*. Again, instruments of this class can be found in sculptures and the reliefs from about the 10th Century A.D. A number of primitive tribes in our country have such chordophones : Pulluvans have the *veena kunju* (it is difficult to believe that this name is really of their true dialect), Santals the *banam*, Pradhans the *khingri* and so on. Also it is quite possible, as discussed earlier, the Chinese fiddle, *hu-ch'in*, might well have gone there from India.

We may recognize two broad categories in this group of instruments : the upright and the inverted. In the first fall all those where the resonator is held down and the fingerboard passes on to the shoulder of the players, as, for example, various kinds of *sarangi* and the *sarinda*. The second comprises those where the bowl rests on or near the shoulder and the *dandi* runs along the arm of the player towards his wrist : for instance, the *Ravanahasta veena*, the *banam*, the *khingri* and the violin.

(i). The upright bowed instruments generally found in the northern areas of the country can be further divided into two groups, the non-fretted and the fretted.

a. The upright non-fretted are again of two very general types : the *sarangi* and the *sarinda* (Note the similarity in the names).

The *sarangi* is a class with regional varieties found throughout the north-western and the northern areas of the country as, for instance, the *Sindhi sarangi* and the *Gujratan sarangi*. In general these, as well as the concert instrument, are constructed on more or less similar lines. The whole body—the lower resonator and the neck with its extension - is scooped out of one piece of wood. The sound chamber has a characteristic waist which allows for the movements of the bow. While this part is covered with parchment, the fretless wide fingerboard has a wooden plate on top and ends in a peg box.

The number of strings are four, some of gut and some of metal. The concert *sarangi* has, for example, three of gut (Sa, Pa_1, Sa_1) and one of brass (Ga_1 or Ma_1). Of these, usually the first two are played, the others being rarely used. These principal strings pass from the bottom over a thin bridge and an upper ledge onto the pegs. Besides the main strings there are about eighteen sympathetic ones (*tarab*). There are two peculiar characteristics of playing the instruments worth noting :

1. The strings are stopped on the sides, using the *nails* of the fingers.

2. The bow is held with the palm facing outward. This is typical of many upright bowed instruments in our country. (Figs. 8.30, 8.31)

How old is the *sarangi* and from where did it originate ? The instrument does not seem to be known in Persia and Arabia and is possibly Indian ; it is most probably north-western in origin. The name itself is perhaps derivable from *saranga* (deer) because its covering membrane might have been originally of deer skin or from *saranga* meaning a bow and hence a bowed instrument.

While the *sarangi* is used both in folk and concert music the *sarinda* is confined only to the former. Also it is found only in the northern areas of the country and is known by this name in the hills ; but the tribes of Bihar who also have such a chordophone call it a *banam*. It is easily distinguished by its very peculiar body. As in the *sarangi*, the body is carved out of a single piece of wood. The bowl has a very deep waist, dividing it into a small lower part, pear-shaped, covered with skin and an open upper large cup without a covering. The fingerboard is itself narrow and ends in a small peg box ; the strings, usually of cotton or gut are three in number and run over a narrow bridge. Unlike in the *sarangi* the strings of the *sarinda* are pressed down with the balls of the fingers. (Fig. 8.32).

b. Of the upright fretted bowed instruments, the best known are the *dilruba* and the *esraj*. While the former is found throughout the north, the latter is confined to Bengal; but both are used in art music, though they have rarely attained any 'respectable' status in concerts. In structure the two are essentially the same, the difference being mainly in the shape of the resonance box. In the *esraj* it is small and slightly 'rounded'; however in the *dilruba* it is a little larger and 'squarish'. In both, the chamber, which is waisted, has a covering of thin skin and is joined to a neck-cum-fingerboard on which are metallic, moveable frets. There are four main strings, all of metal, passing over a ledge like bridge and they are tuned to Ma_1, Sa_1, Sa_1; Pa_2. Besides these, there are also two drone strings (*chikari*) tuned to Sa, Sa^1. Below these and passing through small holes in the bridge is a *tarab* of eleven to seventeen strings. (Fig. 8.33)

(ii). Organology presents here one another interesting problem. If we examine the distribution of the bowed family, a striking fact comes up before us: the upright (*sarangi*, *sarinda* and so on) are much more restricted in their geographical distribution than the inverted instruments. The latter, besides being ubiquitous, can be met with in very primitive tribes as well. It is probable, therefore, that this class is older. Yet, India has developed the *sarangi* into a highly sophisticated concert instrument; and it is the violin, imported from the West, that becomes almost the sole concert bowed instrument of its kind, though the primitive prototypes are ancient and wide spread on the subcontinent.

The inverted instruments which are found throughout the country have no frets, as far as is known.

The number of instruments of this class is quite large as, for instance, the *banam* (Bihar, Orissa), the *kendra* (Orissa), the *kinnari* (Andhra, Mysore), the *pulluvan veena* (Kerala), the *pena* (Assam), the *Ravanahatta* (Gujrat and Rajasthan). We may however study in some detail a few typical ones.

Pulluvans are a tribe in Kerala and are considered to be a very ancient people. They worship the snake and many of their rituals are related to this ; the instruments used by the Pulluvans are also known for their close association with these religious functions. One such is the *pulluvan veena* or the *veena kunju* (*kunju*=small, Malayalam). The name given to it by the tribe itself is not known ; evidently *veena* is not their own word, but of the Sanskritized Malayalam. The instrument, about 50 cm. in length, has a rounded resonator of wood continued into a thin, long neck-cum-fingerboard. The sound box is covered with parchment and on this rests a thin bridge over which passes a single string of fibre tightened by a peg. A short bow the 'hair' of which is also of fibre is employed for playing. (Fig. 8.34)

The *pena* is a small bowed instrument from the north-eastern region, particularly Manipur. A coconut shell covered with skin serves as a resonator. To this is attached a bamboo stick or a wooden tube which is the fingerboard, the whole instrument being about 40 cm. in length. A bunch of hair forms the 'string'. There is neither a nut nor a peg, for the hairs are tied directly onto the bamboo. The bridge is thin and arched. The bow is long with a wooden hand and a bent end. Across this curved part are tied the hair and onto the bow are fixed a number of jingle bells which give beautiful rhythmic effects during playing. While the *pena* is a folk instrument, some authors have identified it with the *pinaka veena* or Sarngadeva's *pinaki*. (Fig. 8.35). An illustration of inverted bowed instrument of the above type is seen in Agastesvara temple, Karnataka.

The *Ravanahatta* is an important member of the family of bowed instruments. As mentioned earlier, the *Sangeeta makaranda* refers to the *Ravanravani*. But it might have been different from the *Ravanahasta veena* of later authors : Sarngadeva, however, gives the *Ravanahastaka* without further details. The *Ravanahatta* found today in Gujarat and Rajasthan is very popular in this part of the country. As in the *pena* a coconut shell covered with parchment forms the belly. The long fingerboard of bamboo, about 70 cm., is inserted into it. There are two main strings, one of twisted steel and one of a set of hairs, which go over a thin bridge on the resonator. They are fixed to pegs at the distal end. Besides these, there are about a dozen (sometimes sixteen) strings which form the sympathetic vibrators. The bow is long and curved (wood or iron) and has jingle bells giving rhythmic sound accompanying the bowing movements. (Fig. 8.36)

While the *sarangi* is the main accompanying instrument in Hindustani music, the violin has made itself indispensable in Karnatak music. There it is not only the sole stringed accompaniment, but also a highly respected solo instrument. Slowly it is spreading in upper India. It is certain that the ancestors of the violin came from Central Asia, if not from India. It is supposed that the instrument came to Europe through the Balkan Peninsula and one of the early illustrations of a violin prototype is from the 9th Century A. D. It might have had as its precursors the fiddle, the Byzantine *kamanga rumi* and the *rebec* ; the last is obviously related to the *rabab* of Arabia. The greatest amongst violin makers were the Amanti family (16th to 17th Century) and Antonio Stradivari (1624-1737 A.D.) of Italy and the German family of Klotz (17th to 19th Century).

The advent of the violin to India is one of the best examples of cultural absorptions in music. We have had bowed instruments for at least 10 centuries or more now ; there are sculptures showing instruments of remarkable similarity to the violin in the Mallikarjuna temple (Vijayavada, 10th Century) and the Nataraja temple (Chidambaram, 12th Century). Rarely, if at all, was it ever known as a concert instrument and it is definite that it came with the Western colonizers—the Portugese, the French and the British, particularly the last. Undoubtedly, it is the finest gift from modern European musical culture. The rich sound qualities and the great versatility of the violin have made its adaptation to Indian music easy and beneficial.

Balusvami Dikshitar (1786-1858), the youngest brother of Muttusvami—one of the immortal trinity of Karnatak music—

is credited with the introduction of the violin into art music. Balusvami's father, Ramasvami, was in the service of Venkatakrishna Mudaliyar of Manali, near Madras, as a musician. Mudaliyar was also employed in the East India Company at Madras. This gave him an opportunity to listen to Western music and along with him went the Dikshitar brothers. It is said that Venkatakrishna engaged a European tutor to teach Balusvami the violin. Balu Dikshitar soon became a very proficient player and his brother's pupil, Vadivelu, also learnt to play the instrument and introduced it to the Court of Travancore. Indeed, Maharaja Svati Tirunal, the then ruler of the state, himself a composer of repute, presented Vadivelu with an ivory violin in recognition of his artistic achievements. From then on it has become a premier instrument in Karnatak music. In Hindustani music, however, it is even more recent, perhaps five decades old. While it is often used as a solo instrument, it seldom finds a place as an accompaniment.

The instrument consists of a body, sound box, to which is attached the fingerboard by means of a neck. The body is made of the curved upper plank (the belly) which has two f-shaped holes and the lower plank (the back). The two are connected by thin plates of wood called the ribs. At the playing end, the fingerboard ends in a head which consists of the peg box and the scroll ; there are four pegs corresponding to four strings. At the end of the belly the strings are fixed to the tail piece, where small screws, one for each string. are fitted for delicate tuning. The bridge standing on the belly is thin and curved at the top to facilitate bowing of the strings. The strings are usually of steel or gut ; sometimes thin gut covered with fine silver coil is used. The tuning is as *Ma, Sa, Pa, Re,* or *Sa, Pa, Sa, Pa.* Inside the body, under the bridge, a small vertical piece of wood, the sound post, is placed, the purpose of which is to conduct sound from the belly to the back. The bow is thin and long, unlike that of the *sarangi*. The stick is much longer and is almost straight and horse hair is fixed permanently to the distal end. At the holding end they are attached to a moveable piece which can be shifted forward or backward by means of a screw inside the bow. This gives the proper tension to the hairs of the bow. (Fig. 8.37)

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NOTE ON THE JALTARANG

A reviewer (*Qly. Jl of. Nat. Centre for the Performing, Arts,* VI.1. 1977, p. 56) was critical of my statements on this instrument in the Marathi version. He has found fault with :

1. The vagueness of my historical identification of the *jaltarang*.

2. "A perusal of *Jayamangala* commentary would have provided him with the

DESCRIPTION OF THE PLAYING TECHNIQUE of the Udakavadyam : it leaves no doubt that the INSTRUMENT was NOT like the Jalatarang".

Now :

1. I have said in the Marathi book (p. 30) that *in the opinion of some scholars* the *udakavadya* COULD have been the *jaltarang* I have also *definitely* stated that the instrument is mentioned by name in the *Sangeeta Parijata* of Ahobala (17th Century).

The reader of this book would have gathered by now how scattered and unreliable the data on our instruments are. The best one can do is to gather as much information as possible (a very difficult task !) and present these, sometimes without comment. This has been the case with the *jaltarang*.

2. At the time of writing, I had no access to Yasodhara's, *Jayamangala*. This particular reference has been made available to me now. Commenting on the *udakavadya* he says ;

Udakavādyam iti ! *udaka murajādivavādyam* / *udakāghāta iti*/ *hastayantra muktairudakaistāḍanam tadubhayam jalakrīḍāṅgam*.

Roughly translated :

"*Udakavādyam* / it is like *muraja* (?) (it sounds ?)/beating (with ?) water / beating by water released by *hastayantra* (?) / both are parts of water sports."

Kalidasa in his *Raghuvamsa* (16.13) has the following phrase, having the same import.

Yat pramadā karāgraihi mṛdaṅga dhira dhvanimanavagacchan

"Struck by the fingers of beautiful damsels, the water of the lakes used to imitate the grave sound of *mṛdaṅga.*"

Evidently the *udakavadya* was nothing more than the sounds of water beaten and splashed by gamboling ladies ; the sounds are only being compared to those of *muraja* and *mṛdaṅga.* My inference is corroborated by Prof. A. G. Mangrulkar (Pune), who had led me to these references. He says, in a personal communication, "It appears from the commentary that *udakavadya* is a misnomer as it has nothing to do with any musical instrument."

Obviously the reviewer did not study *Jayamangala* carefully. There is no question "of the playing technique of the *udakavādyam*;" and "the instrument was not like the jaltarang." For, the *udakavadya* was not an instrument at all, as he would have us believe it was !

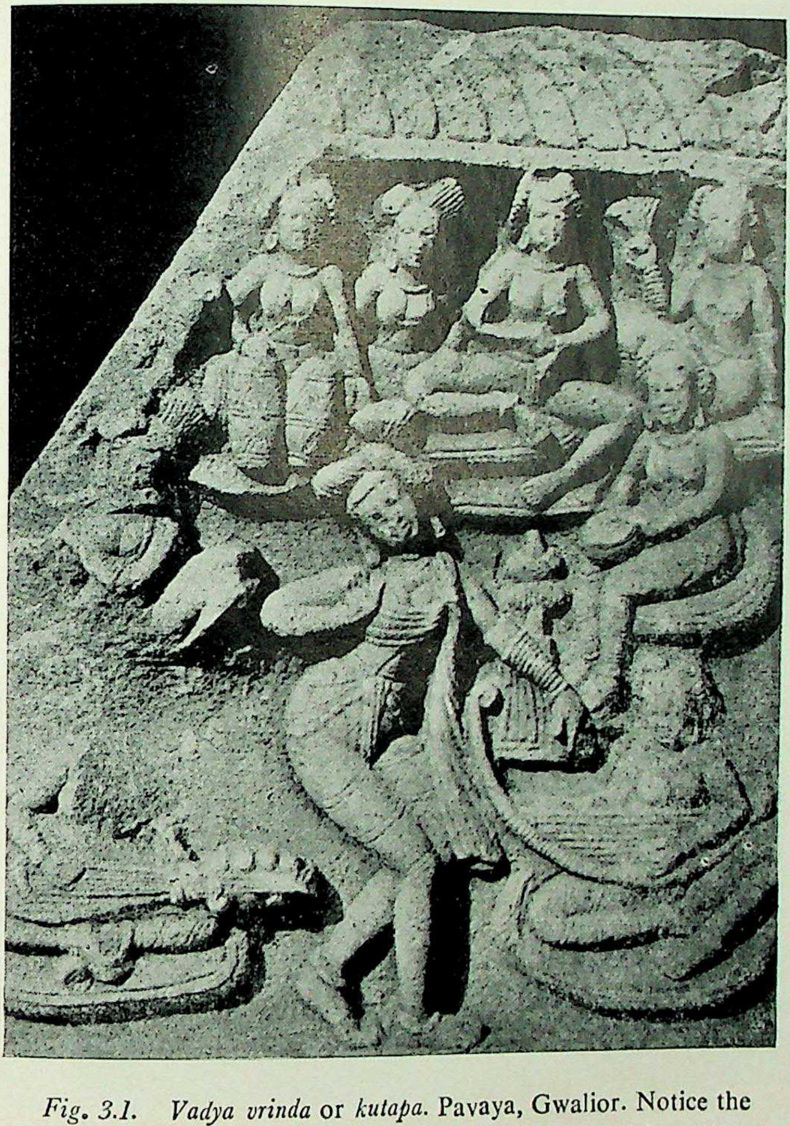

Fig. 3.1. Vadya vrinda or *kutapa*. Pavaya, Gwalior. Notice the *kacchapi veena* on the left and the *vipanchi* on the right. Also, at the back can be seen a pair of drums as well as a small conical drum on the lap of a woman musician. Between the *kacchapi* and the double drums (on the left) can be seen the remains of a horizontal flute.

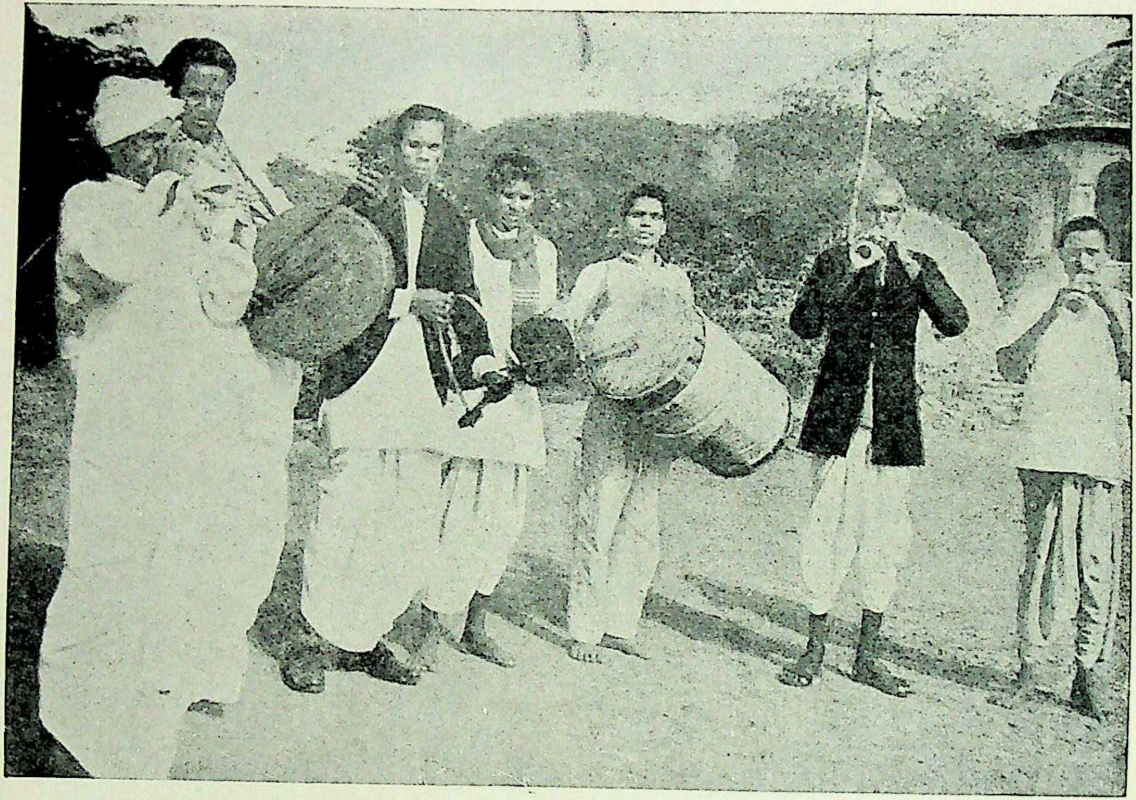

Fig. 3.2. The *pancha vadya* of Orissa, consisting of the *sankh*, the *changu*, the *thiski*, the *ghanta*, the *dhol* and a pair of *mohori*. The *thiski* is not a traditional component, but a recent inclusion from Madhya Pradesh—a clear case of migration and absorption.

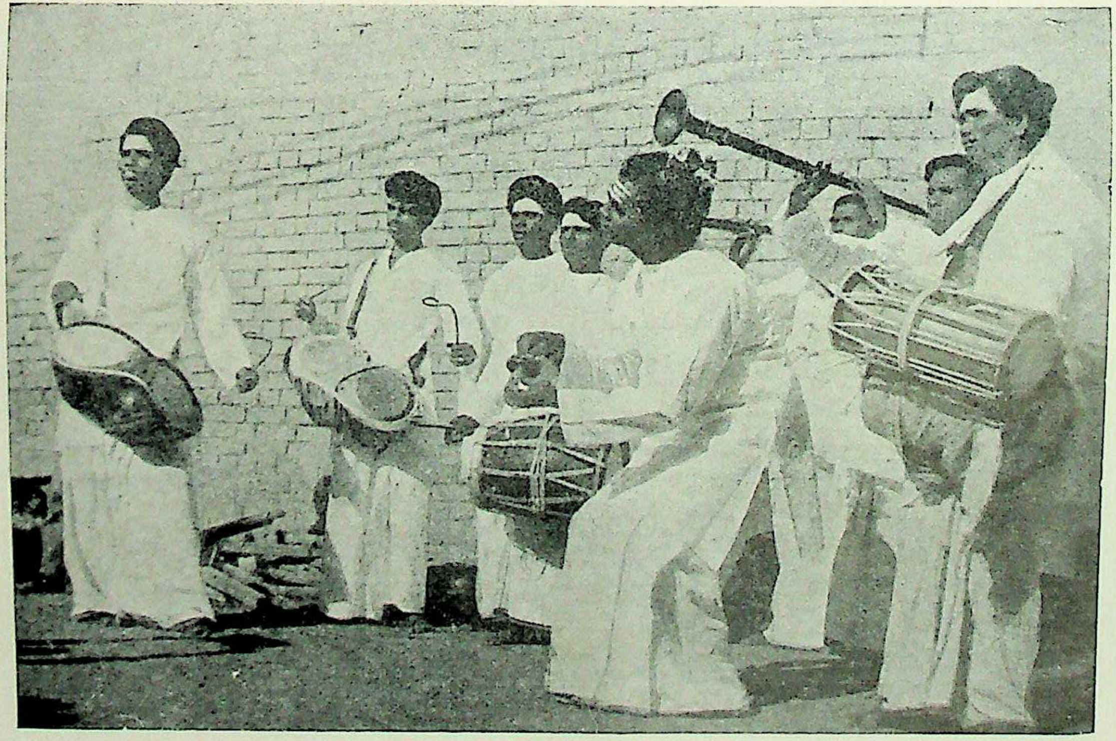

Fig. 3.3. The *nayyandi melam* of Tamil Nadu, comprising the *kuntalam* (two), the *tavil*, the *talam*, the *nagasvaram* (two) and the *pambai*.

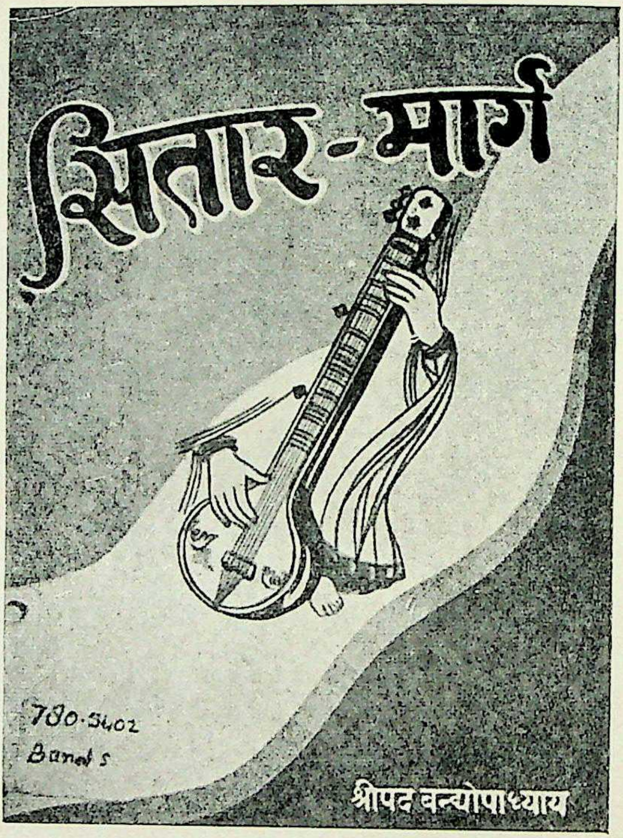

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Fig. 4.1. An 'artistic' drawing of the *sitar*. Compare it with the actual instrument and the degree of stylization and distortion will only be too evident (Reproduced from the cover jacket of a publication by the Sangeet Karyalaya, Hathras).

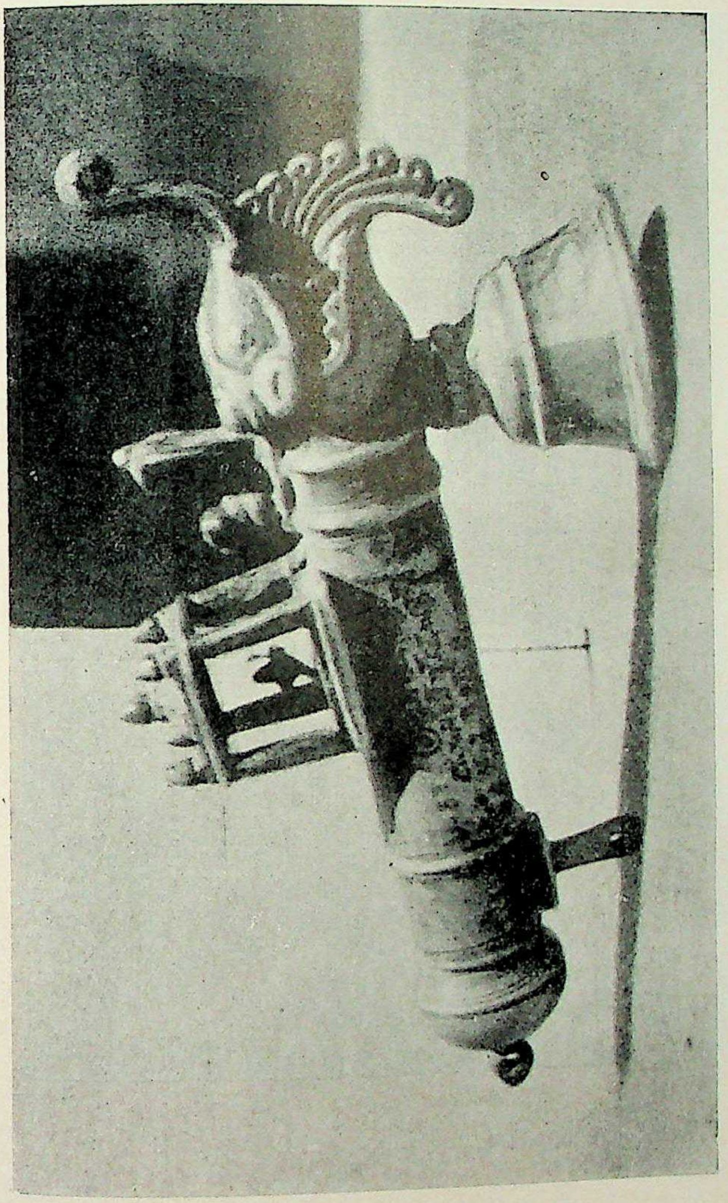


Fig. 5.1. A decorated bell.

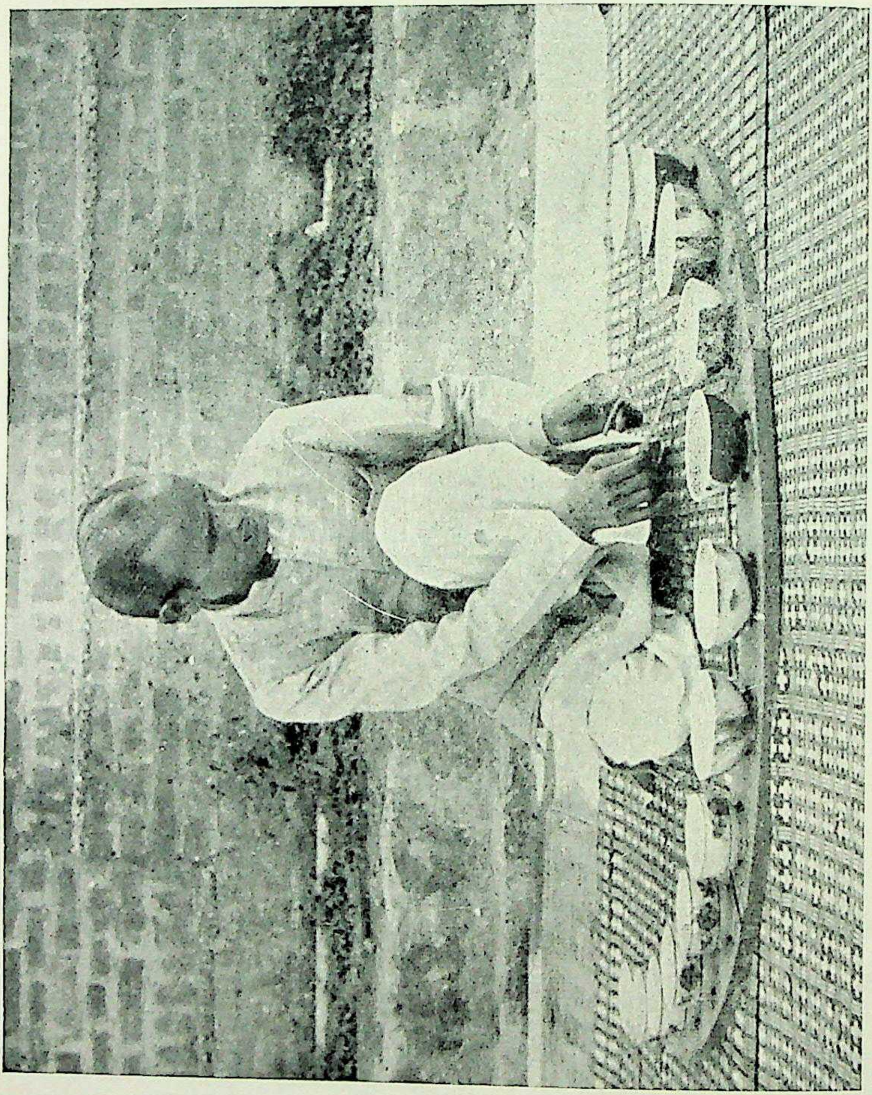


Fig. 5.2. The *jaltarang.*

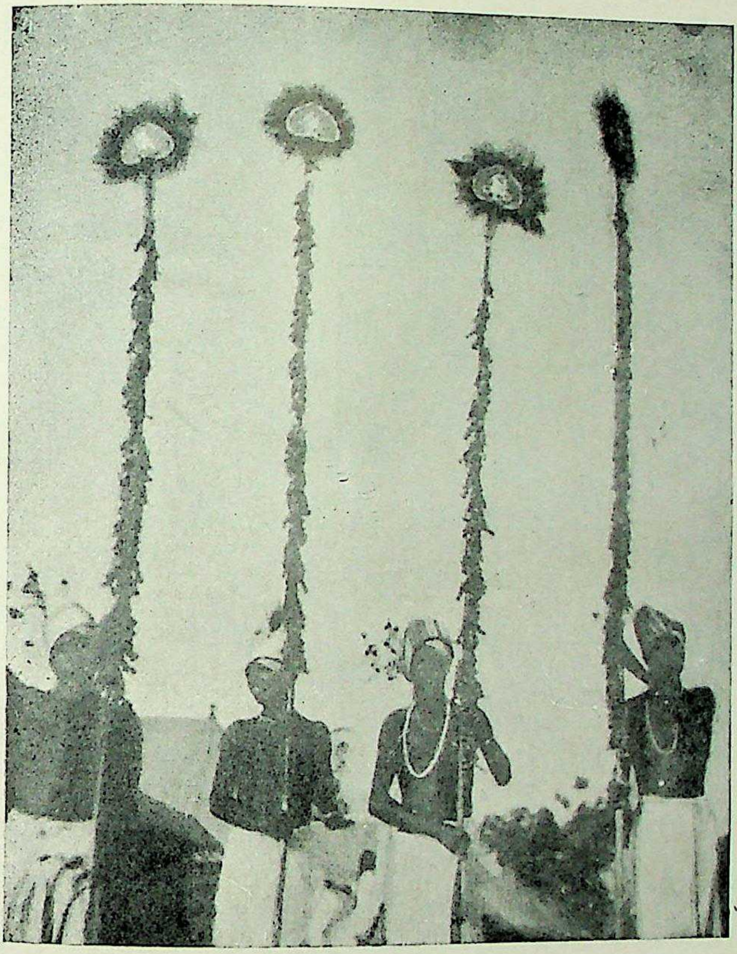


Fig. 5.3. The *kaniyari danda*, Orissa.

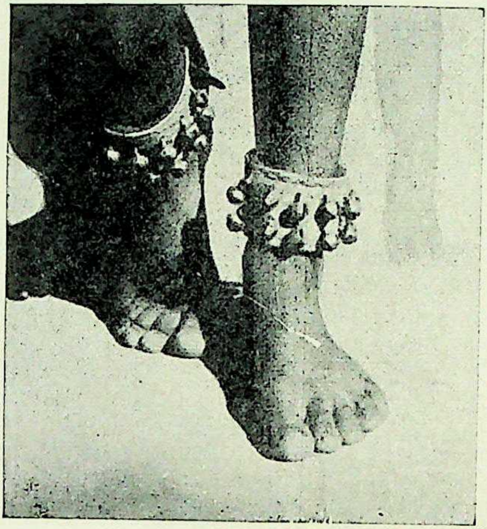


Fig. 5.4. The *ghungru*.

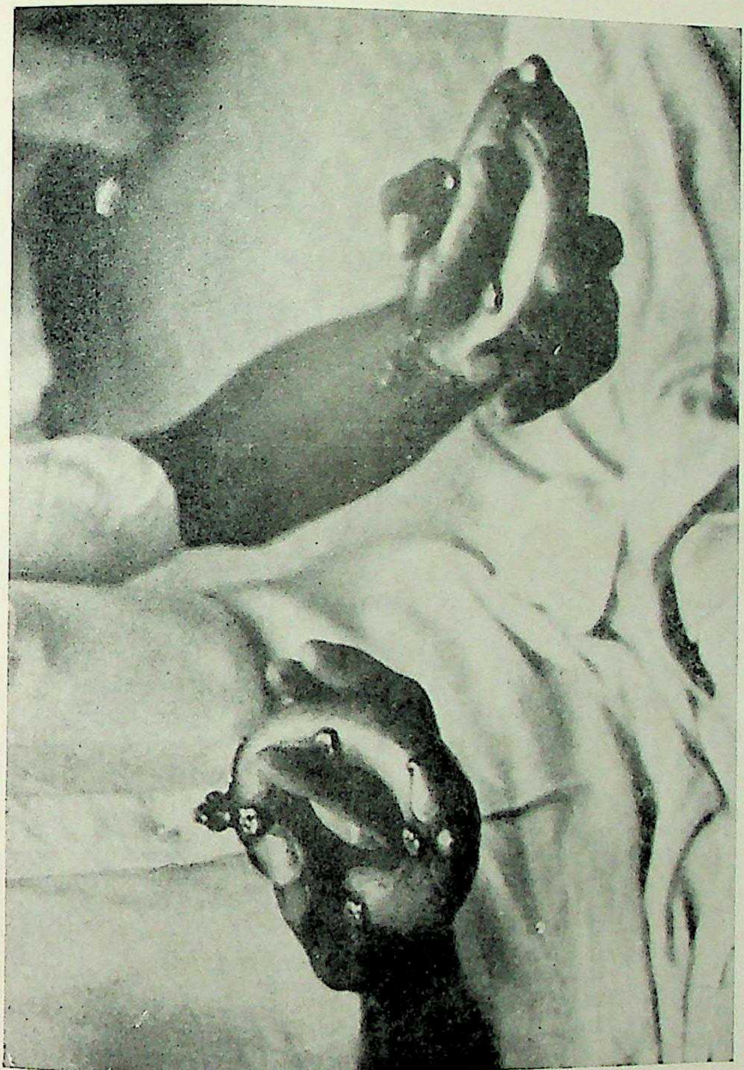


Fig. 5.5. The *kai chilambu*. Tamil Nadu.

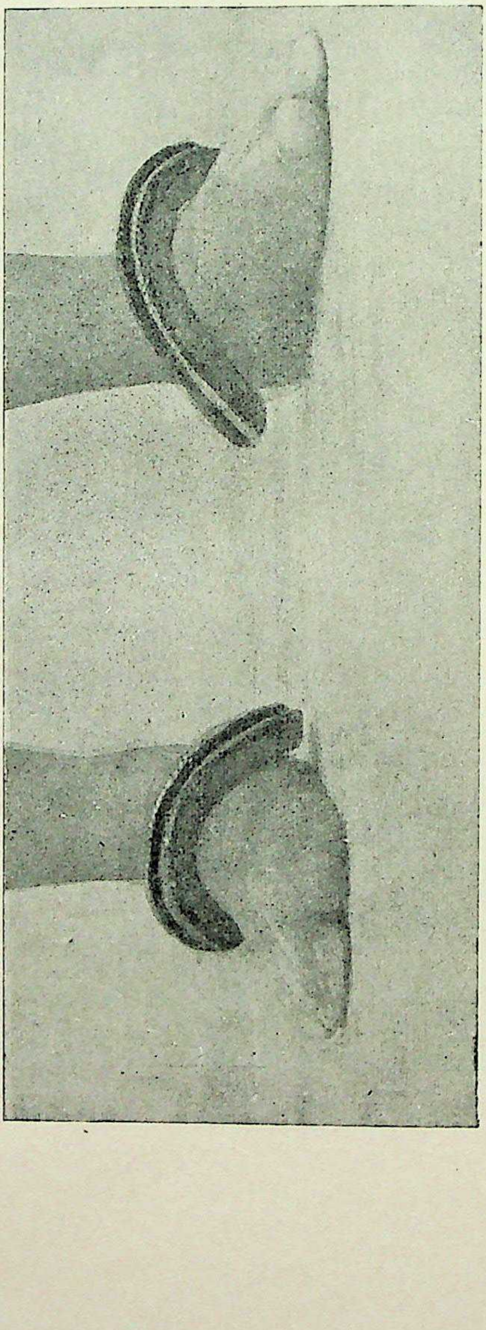


Fig. 5.6. The *panjani*. Madhya Pradesh.

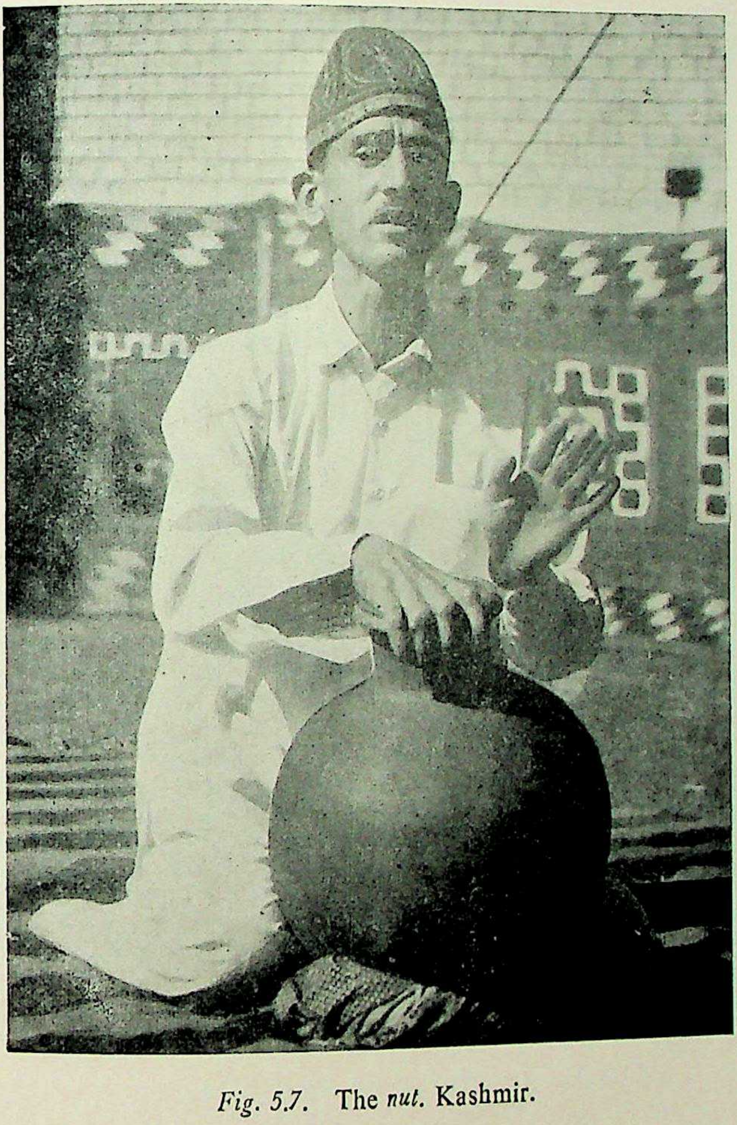


Fig. 5.7. The *nut*. Kashmir.

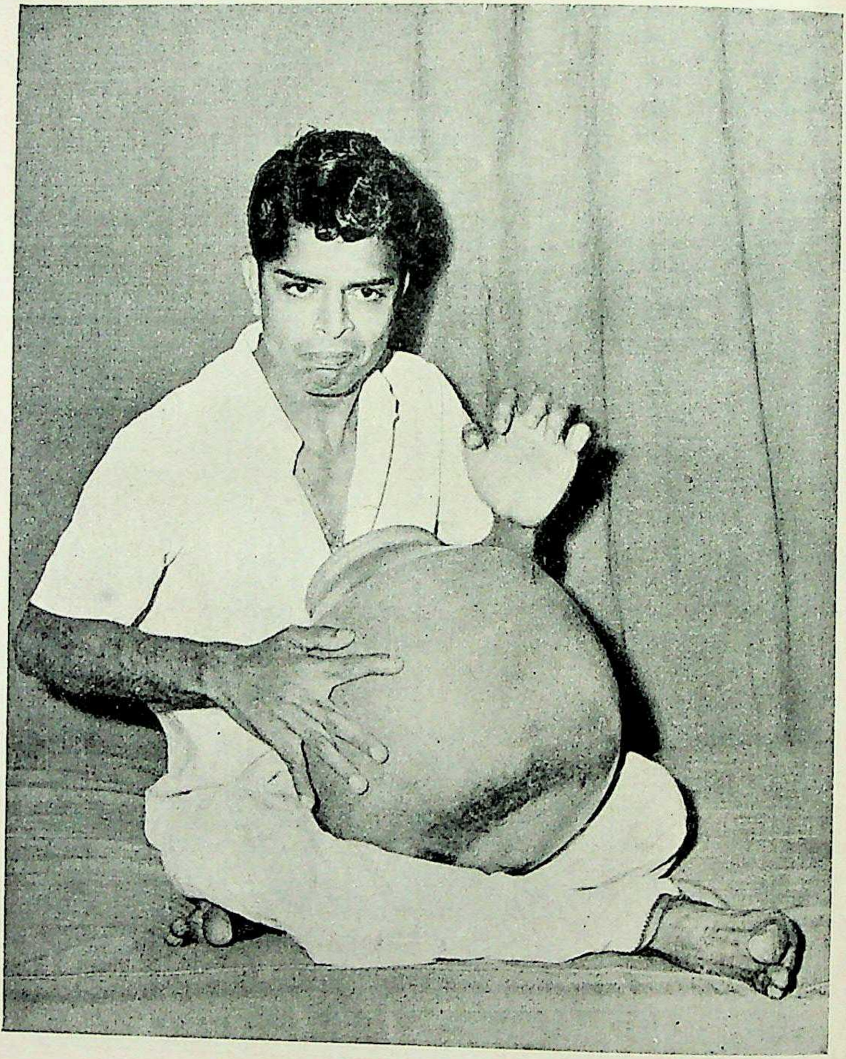
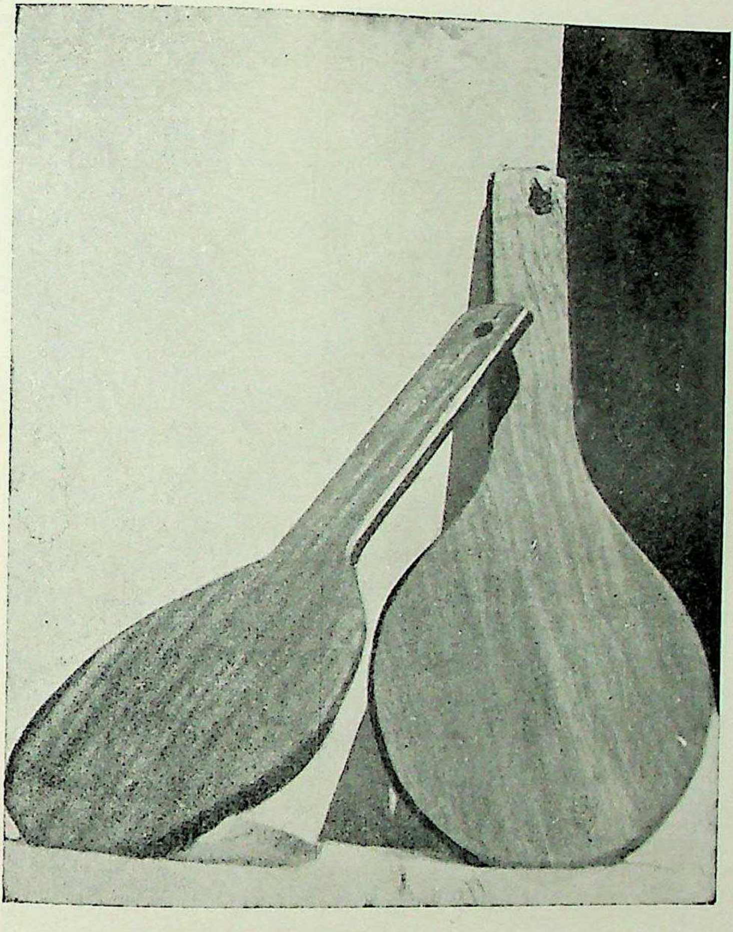


Fig. 5.8. The *ghatam*. South India.



Fgi. 5.9. The *chekkai*. Tamil Nadu.

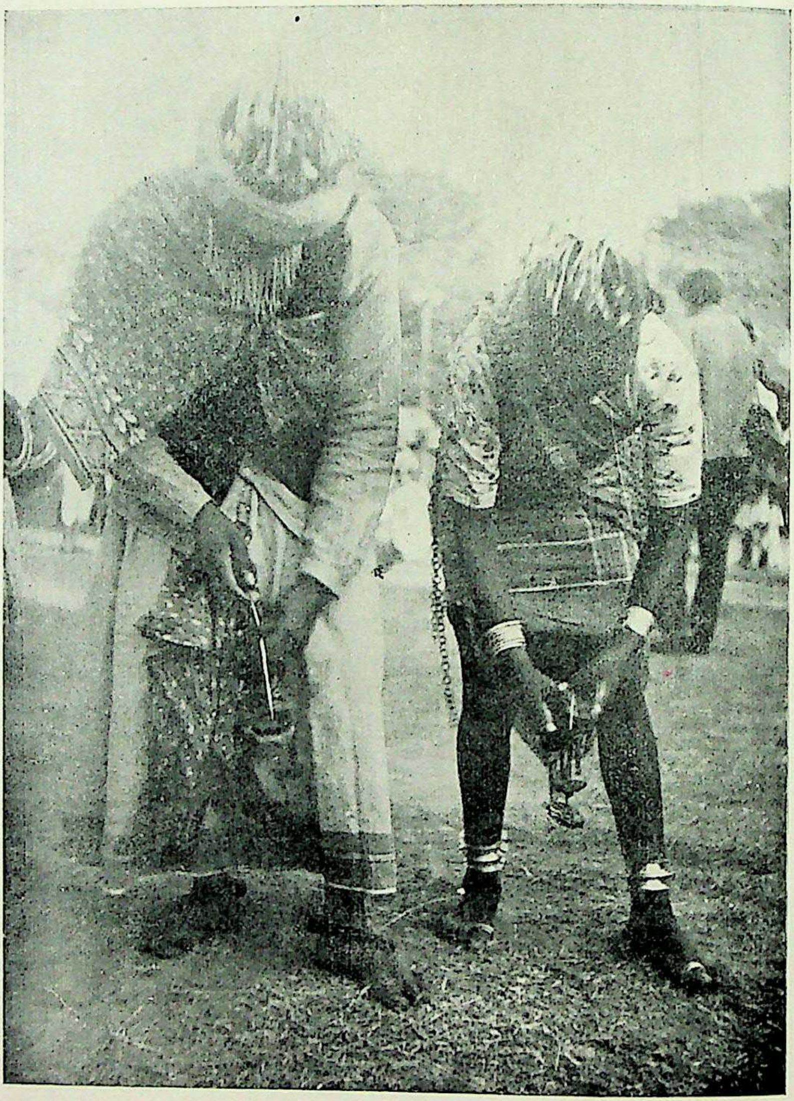


Fig. 5.10. The *thiski*. Madhya Pradesh.

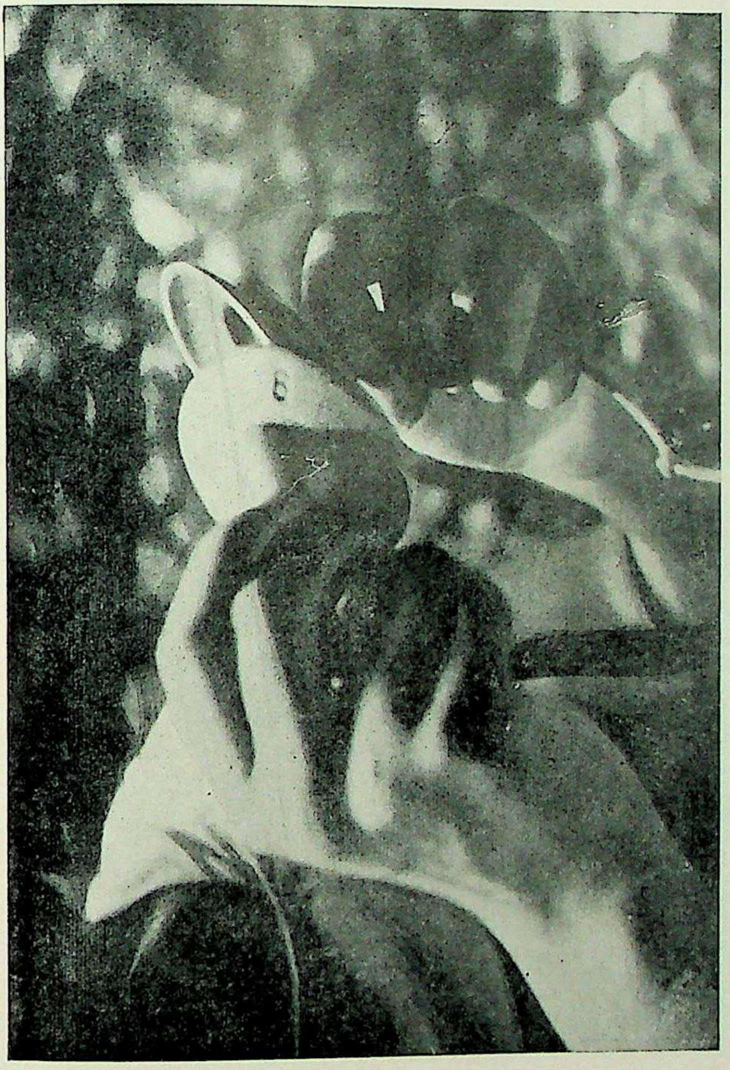


Fig. 5.11. The *manjira.* North India.

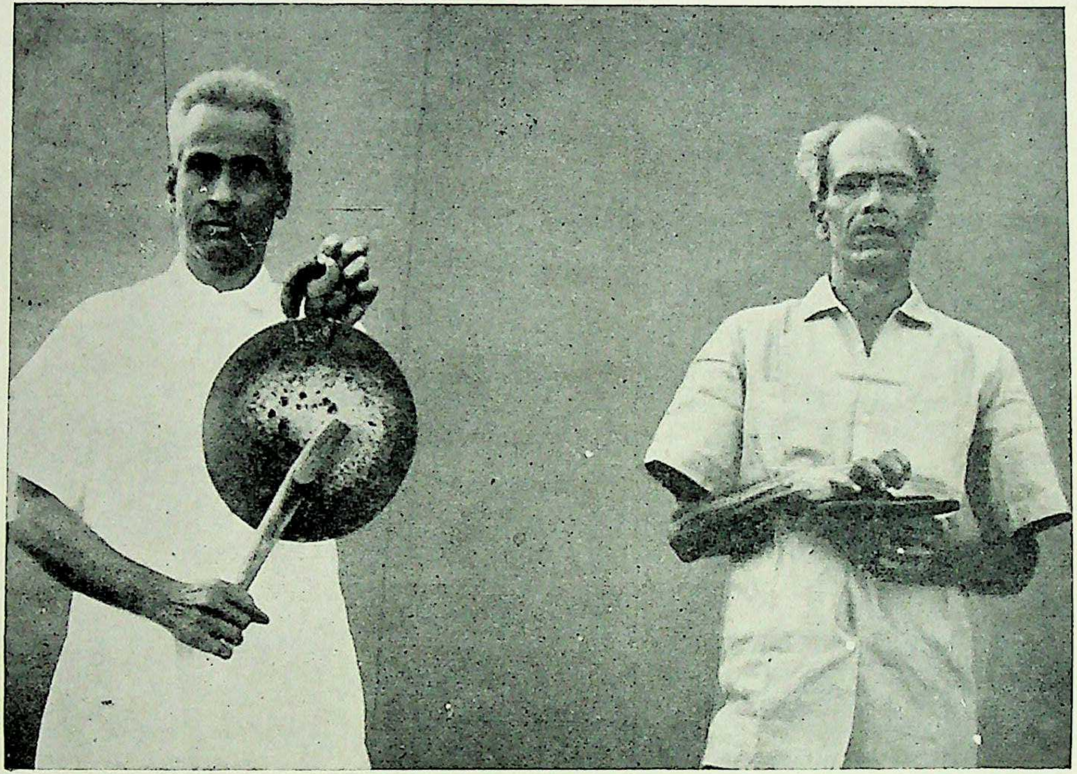


Fig. 5.12. The *semmankalam* (left) and the *eattalam* (right). Kerala.

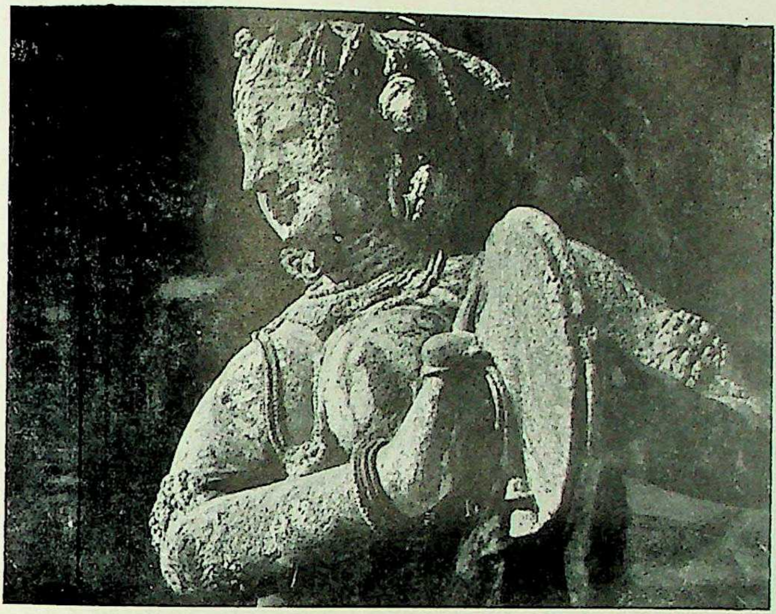


Fig. 5.13. The *jhallari*. Konarak, Orissa. 13th Cent. A.D.

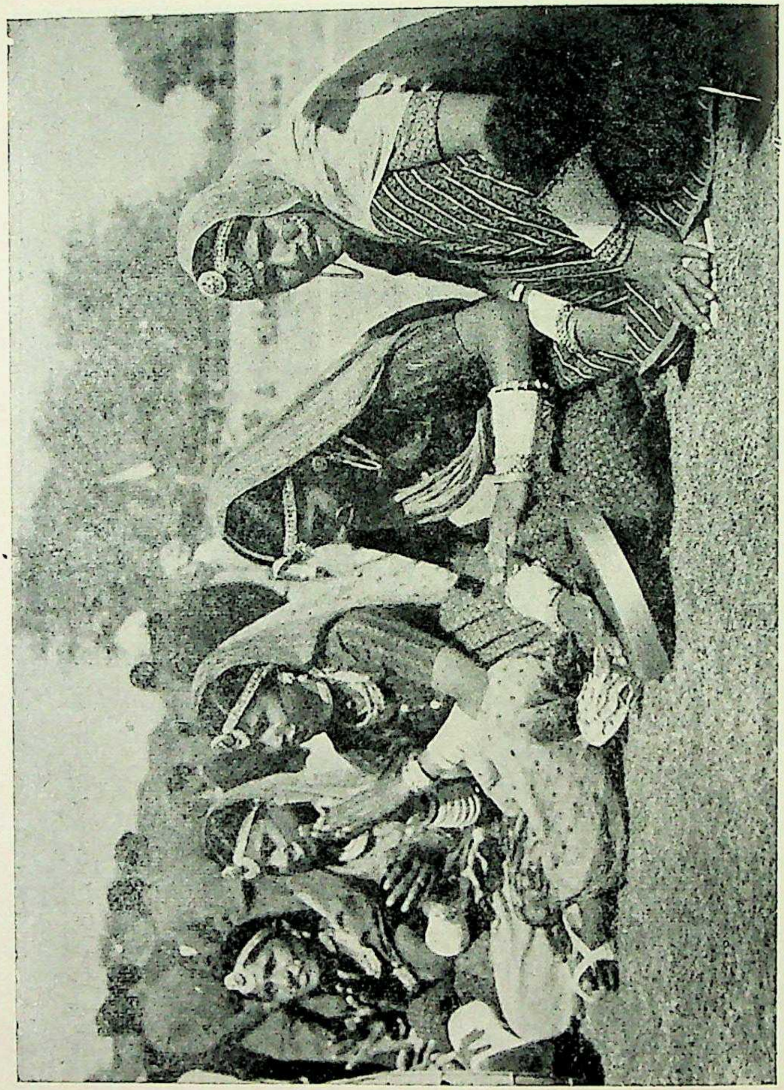


Fig. 5.14. The *thali*. Rajasthan.

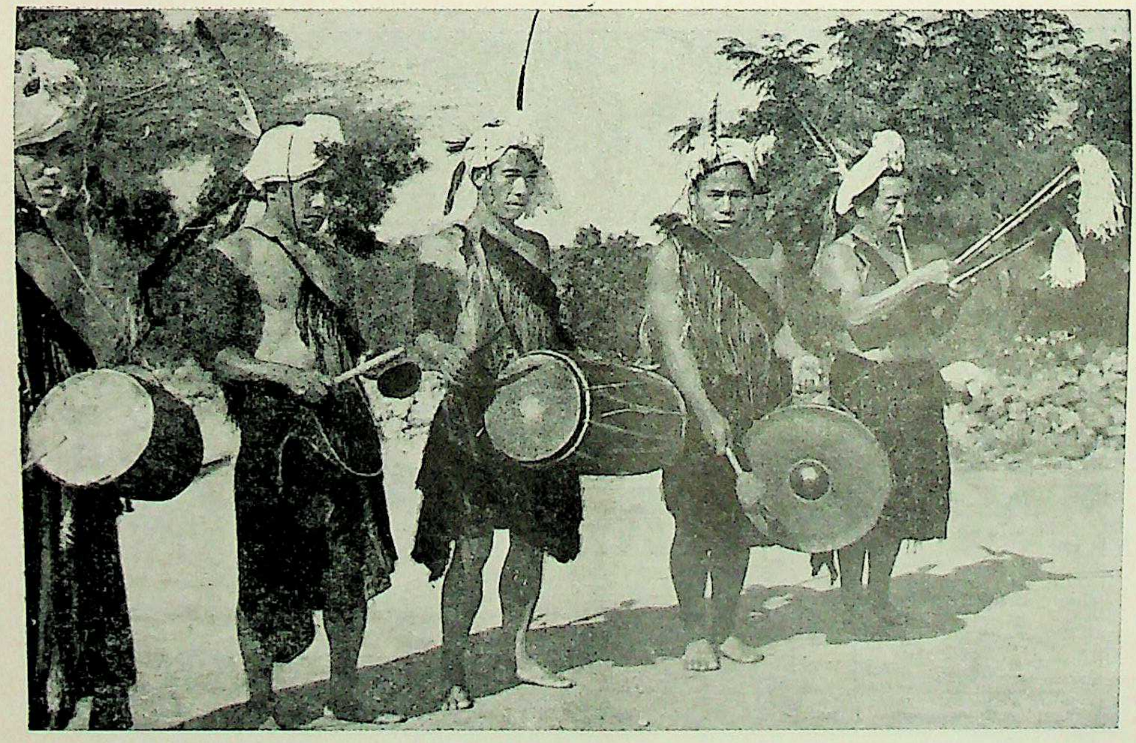


Fig. 5.15. The *dimkidi*, the *sikri*, the *rameng*, the *simu*, and the *rusem (khung)*. Manipur.

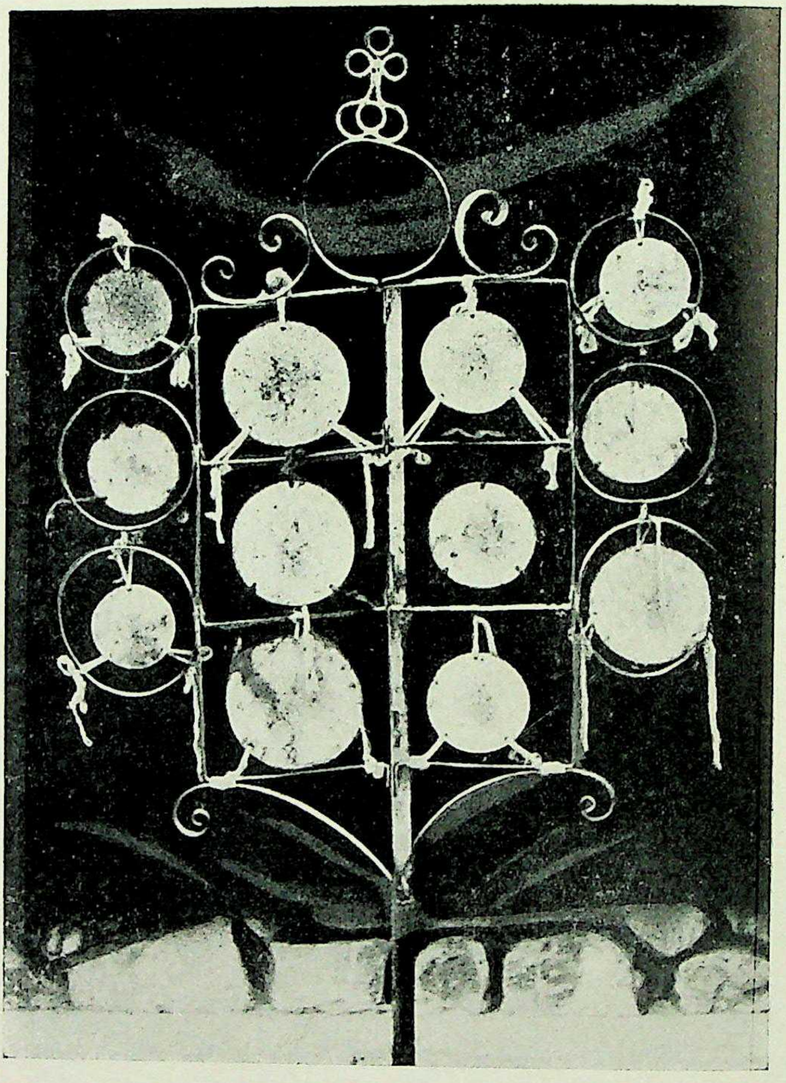


Fig. 5.16. The *srimandal*, Rajasthan.

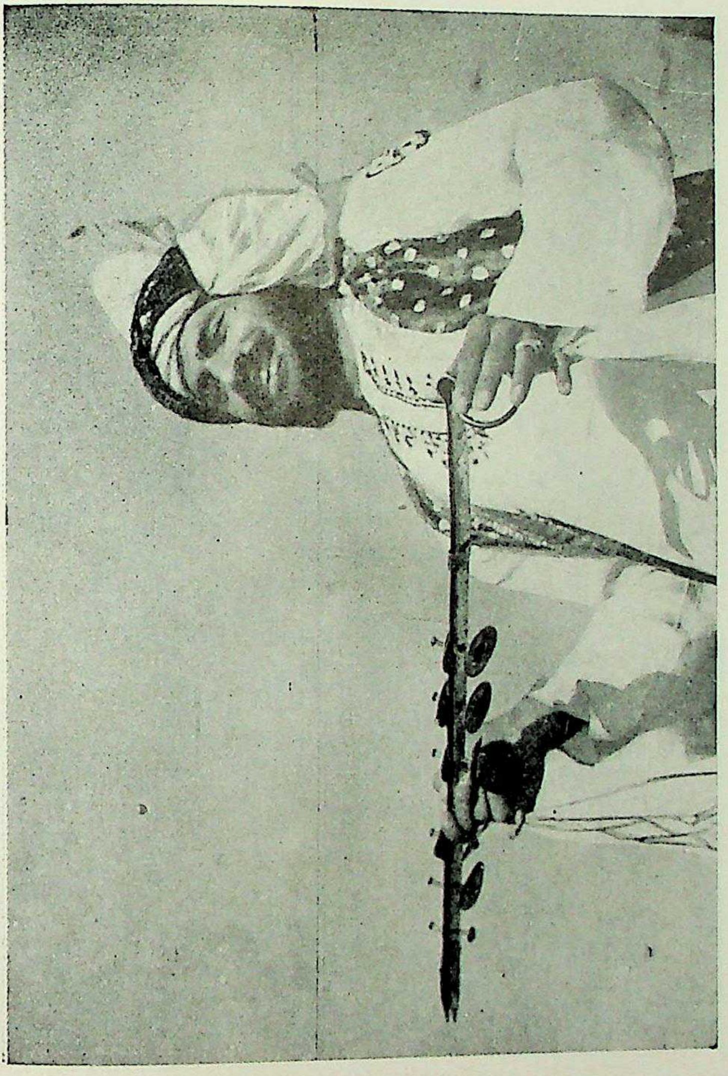


Fig. 5.17. The *chimta*. Punjab.

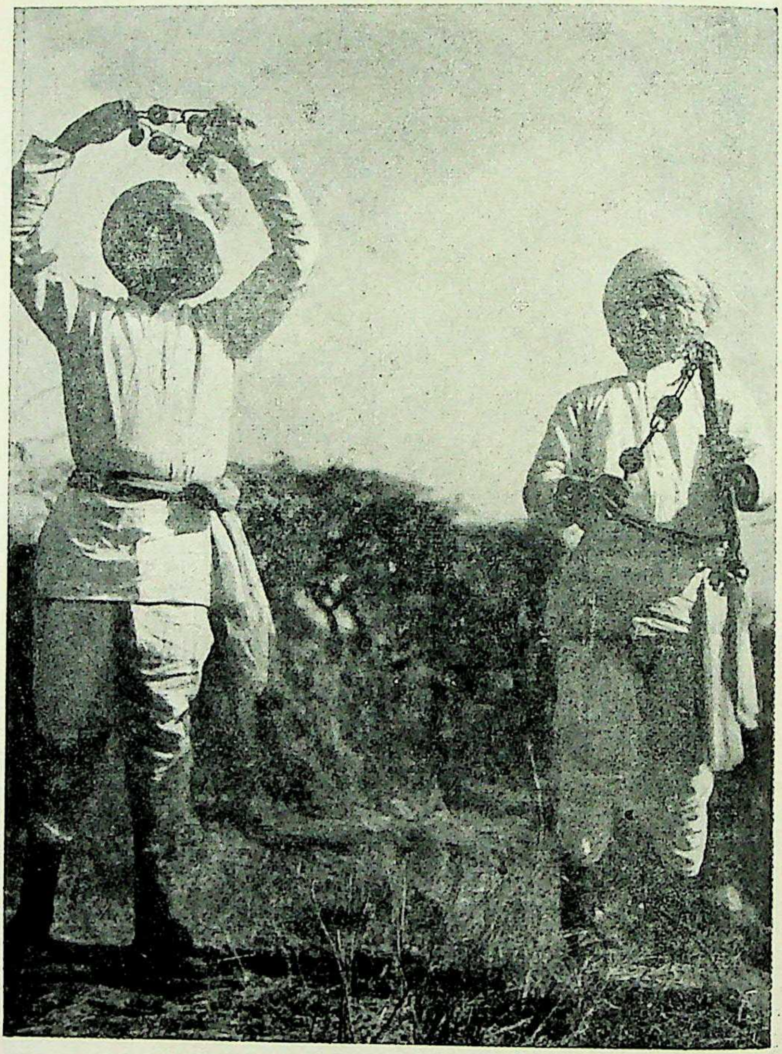


Fig. 5.18. The *lezim*. Maharashtra.

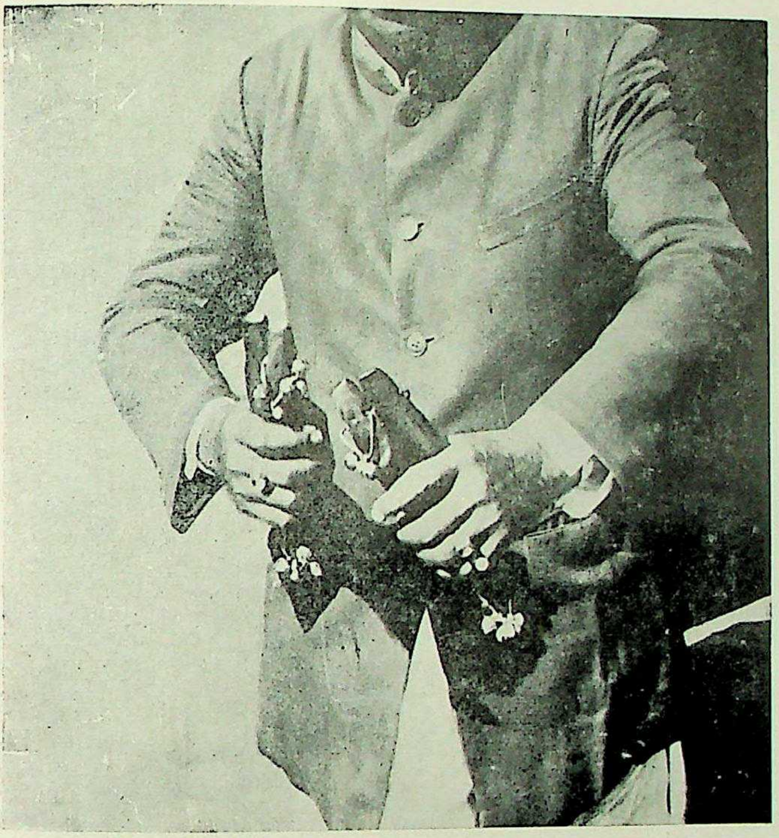


Fig. 5.19. The *kartal (das kathiya)*. Orissa.

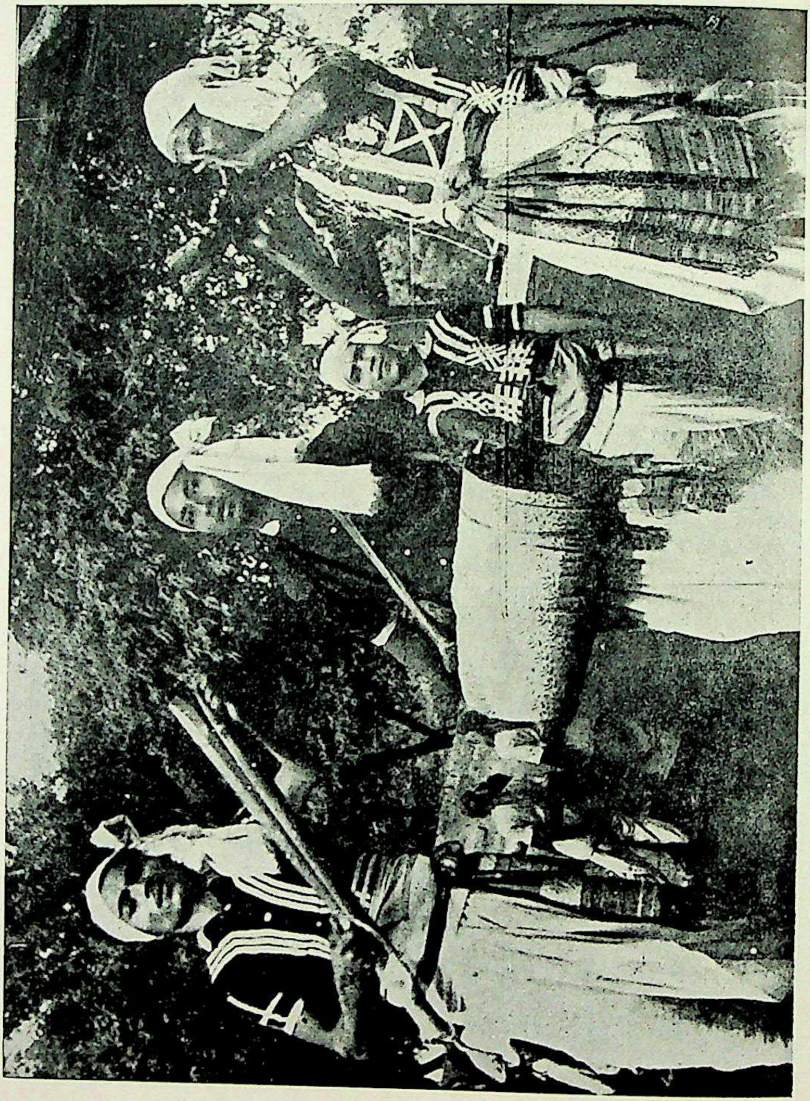


Fig. 5.20. The *tokka*, the *dhol* and the *pepa* (a single beating reed). Assam.

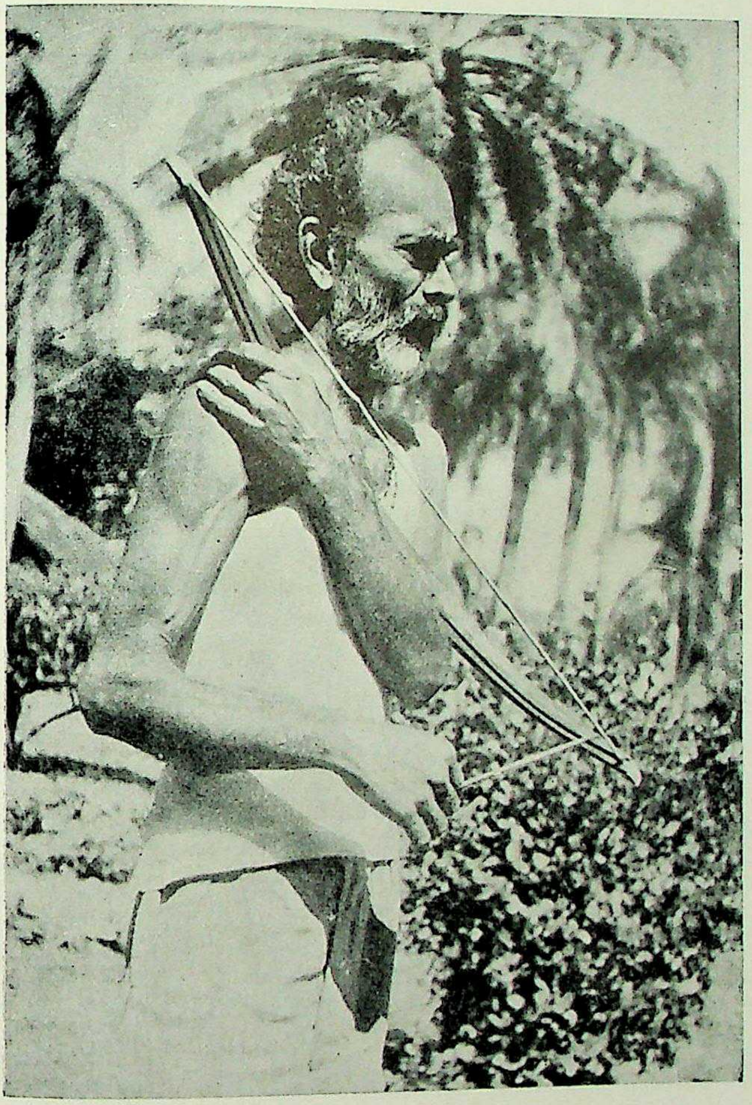
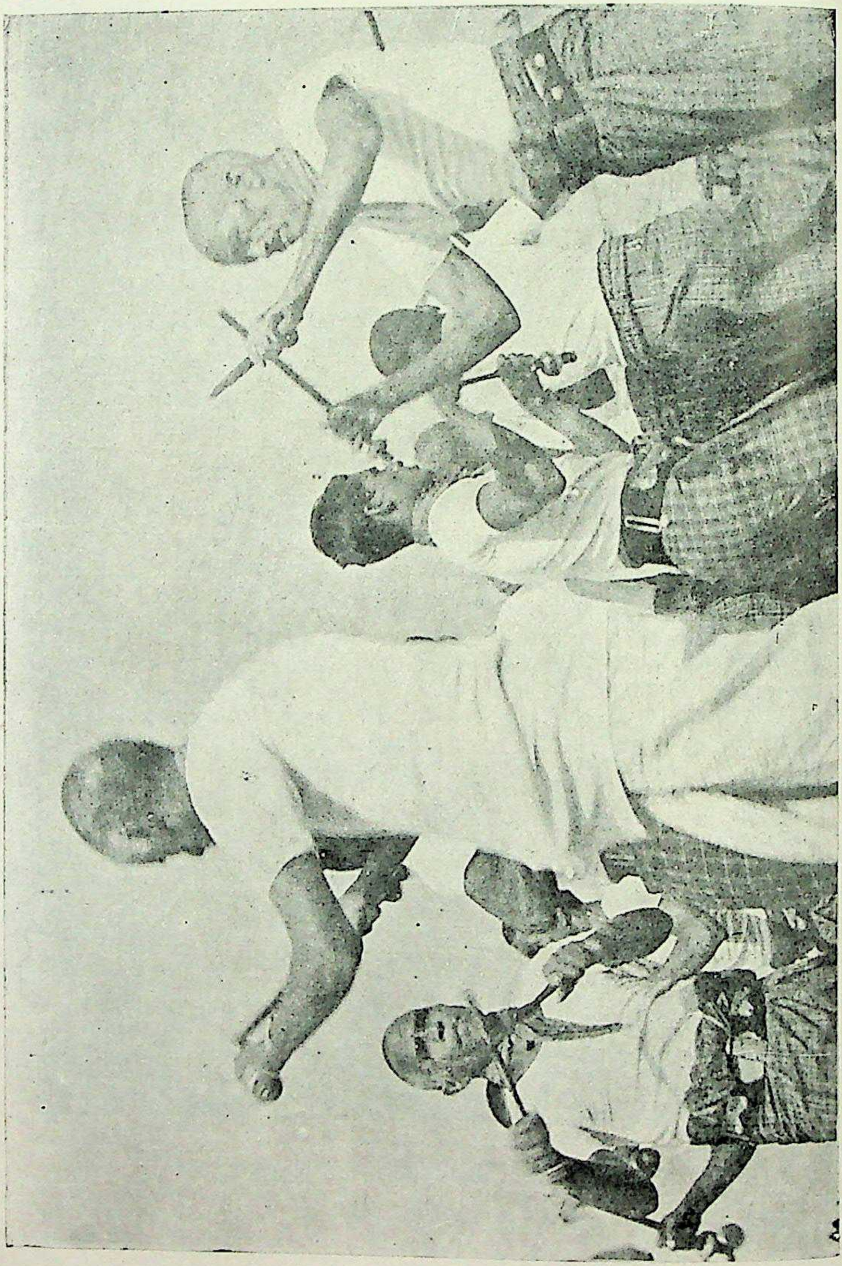


Fig. 5.21. The *villu kottu*. Kerala.



Fgi. 5 22. The *kolattam.* Kerala and Laksha dveep.

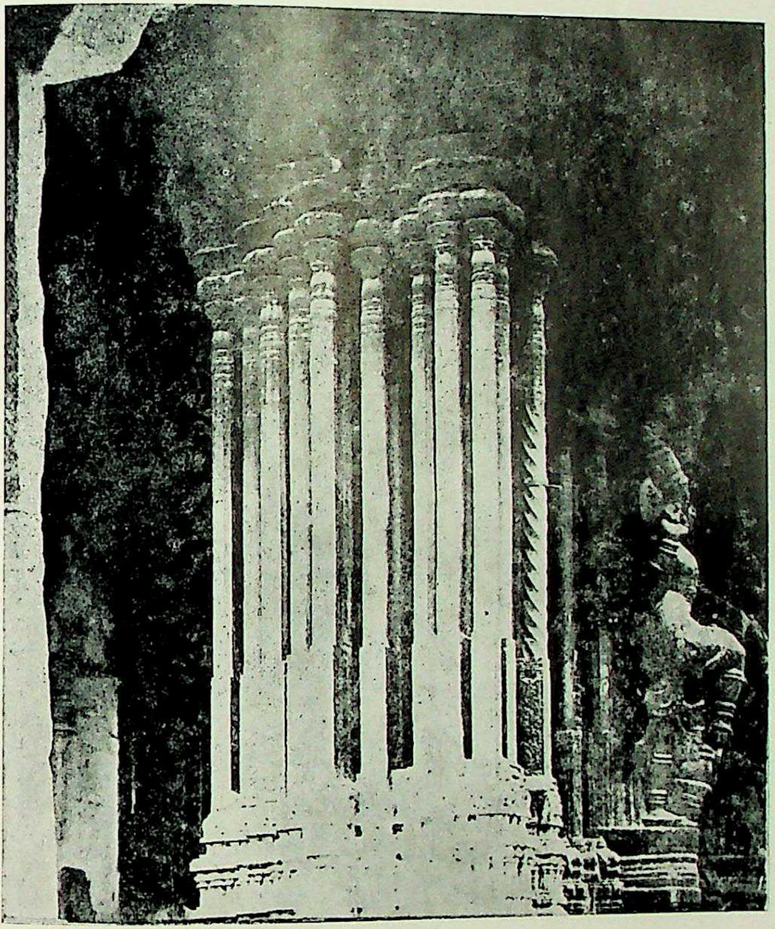


Fig. 5.23. The musical pillar at Tirunalveli, Tamil Nadu. 18th Cent. A.D.

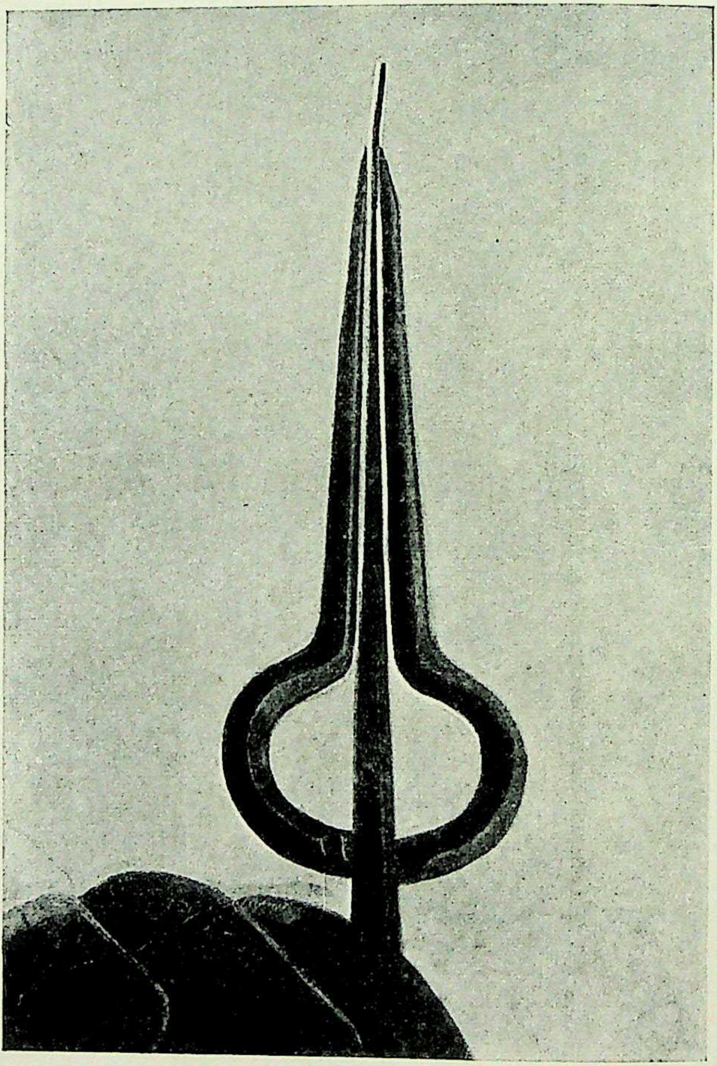


Fig. 5. 24(*a*). The *murchang*. Rajasthan.

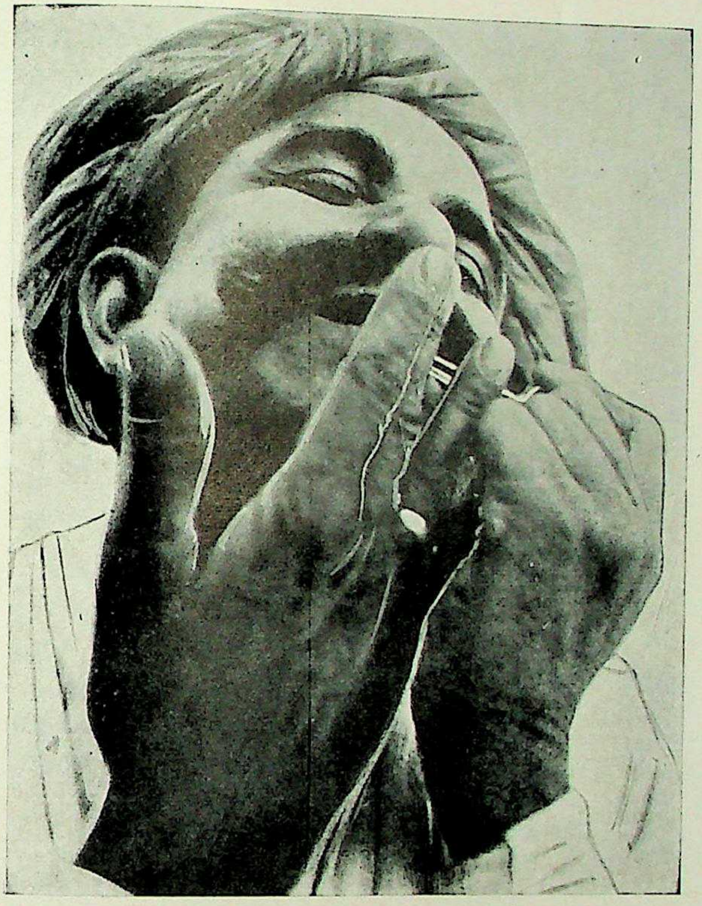


Fig. 5.24(b). The *murchang* playing. Rajasthan.

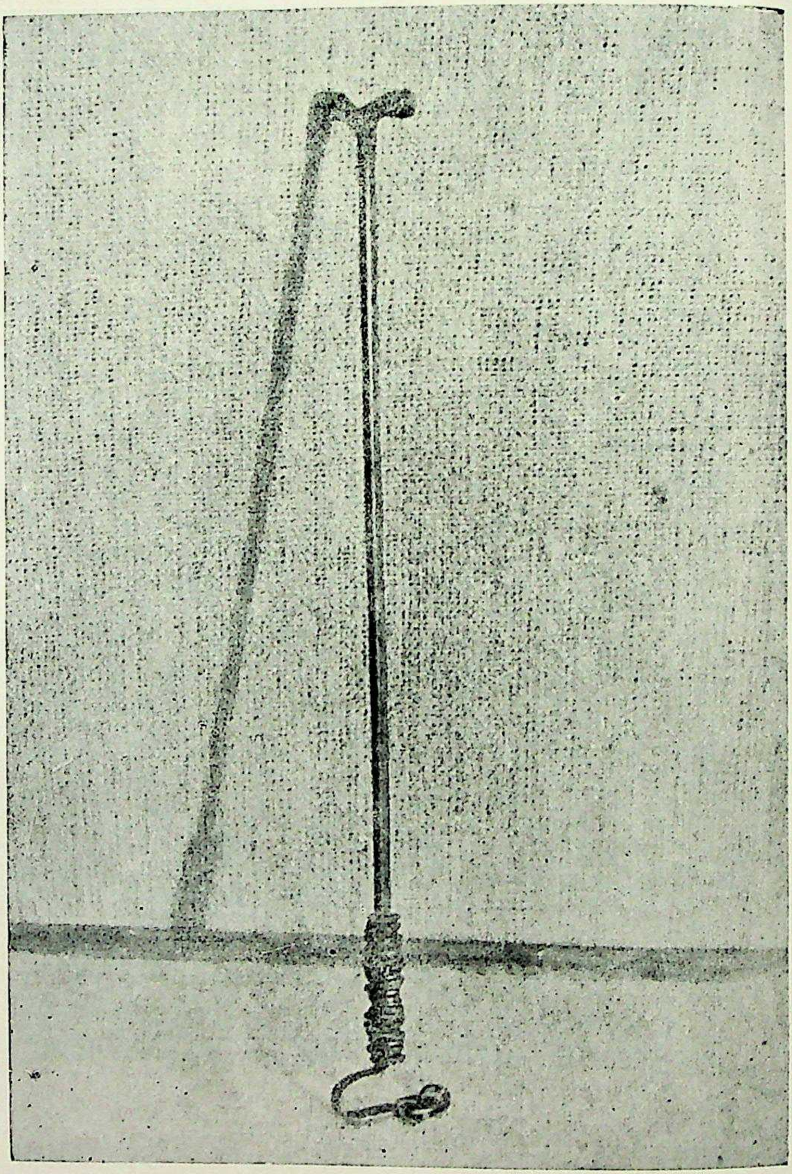


Fig. 5.25. The *laddi shah.* Kashmir.

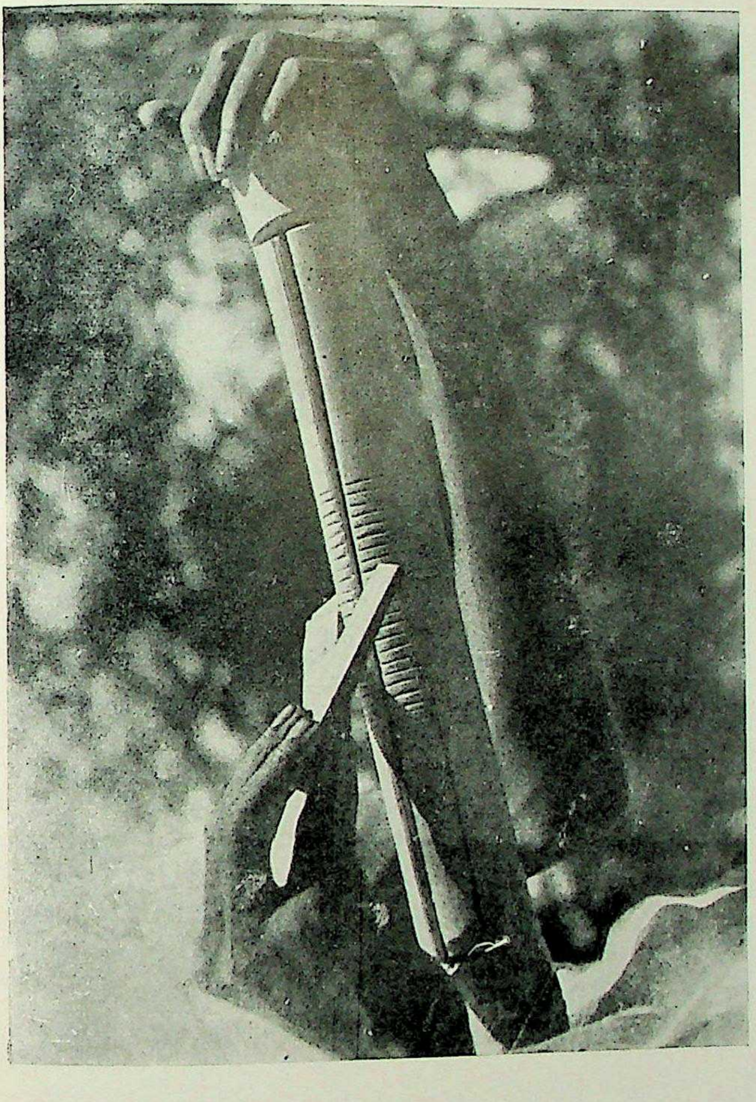


Fig. 5.26. The *ruga braia*. Andhra.

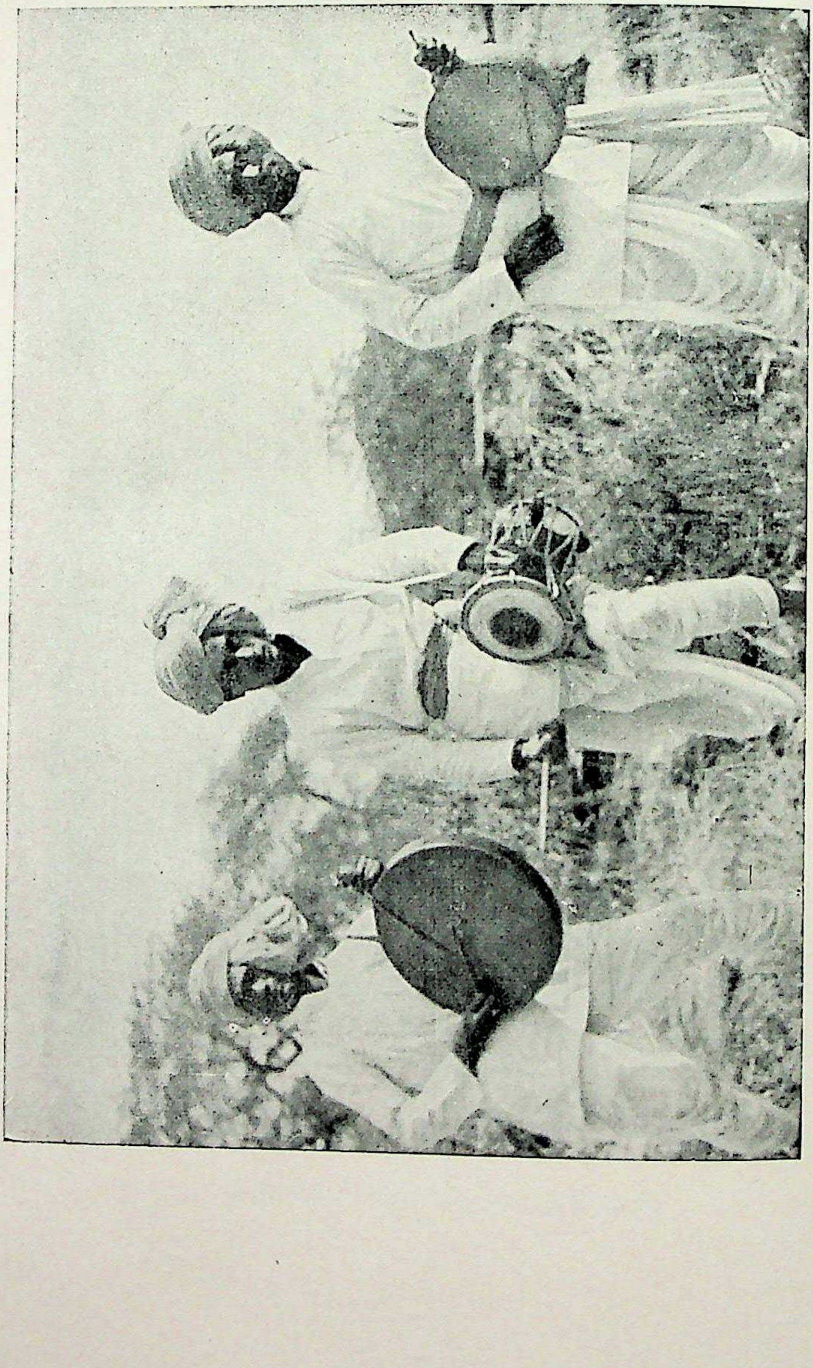


Fig. 6.1. The *halgi*, the *guruki* and the *kade*. Maharashtra.

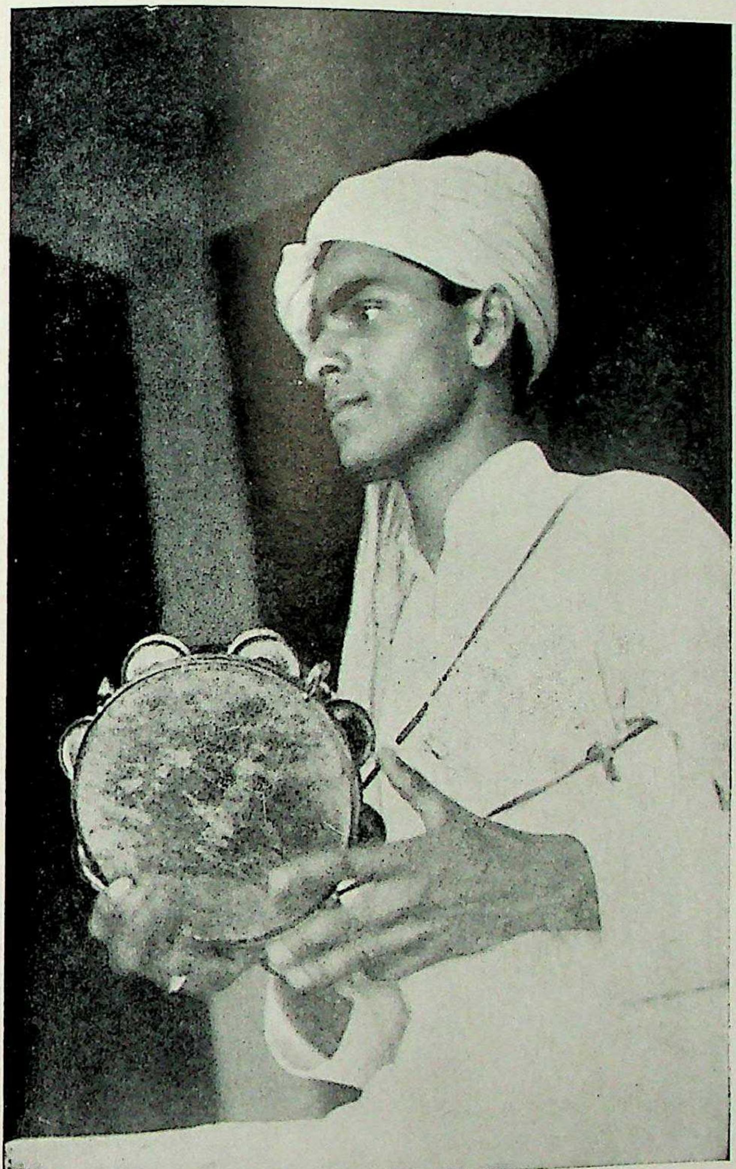


Fig. 6.2. The *khanjari*. Uttar Pradesh.

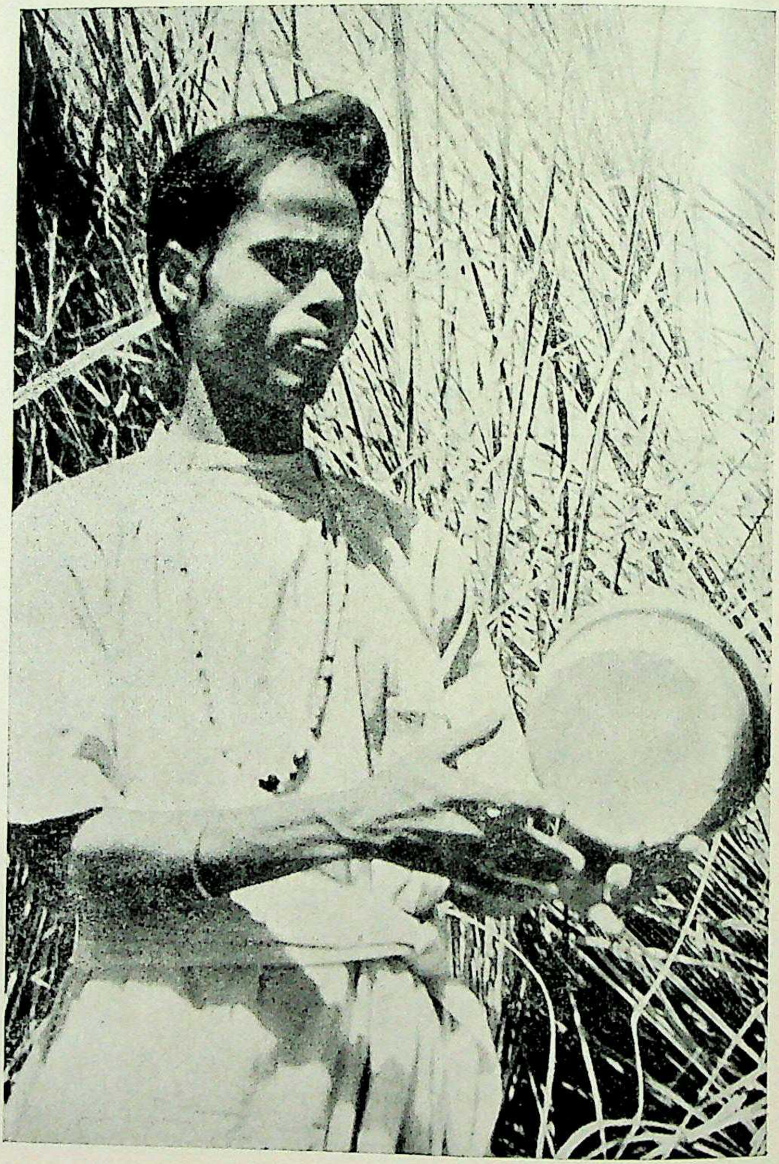


Fig. 6.3. The *khanjari*. Bengal. Similar to the *kanjira* of South India.

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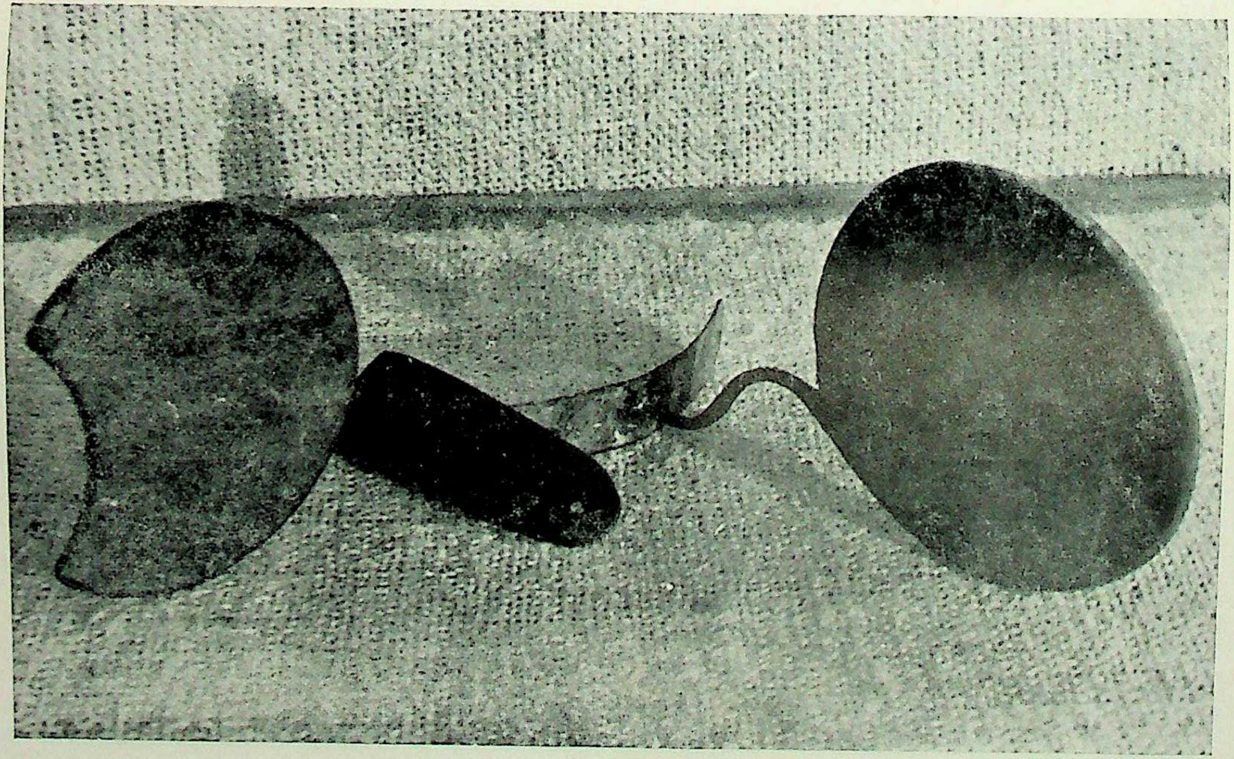

Fig. 6.4. The *chandra pirai* and the *surya pirai.* Tamil Nadu.

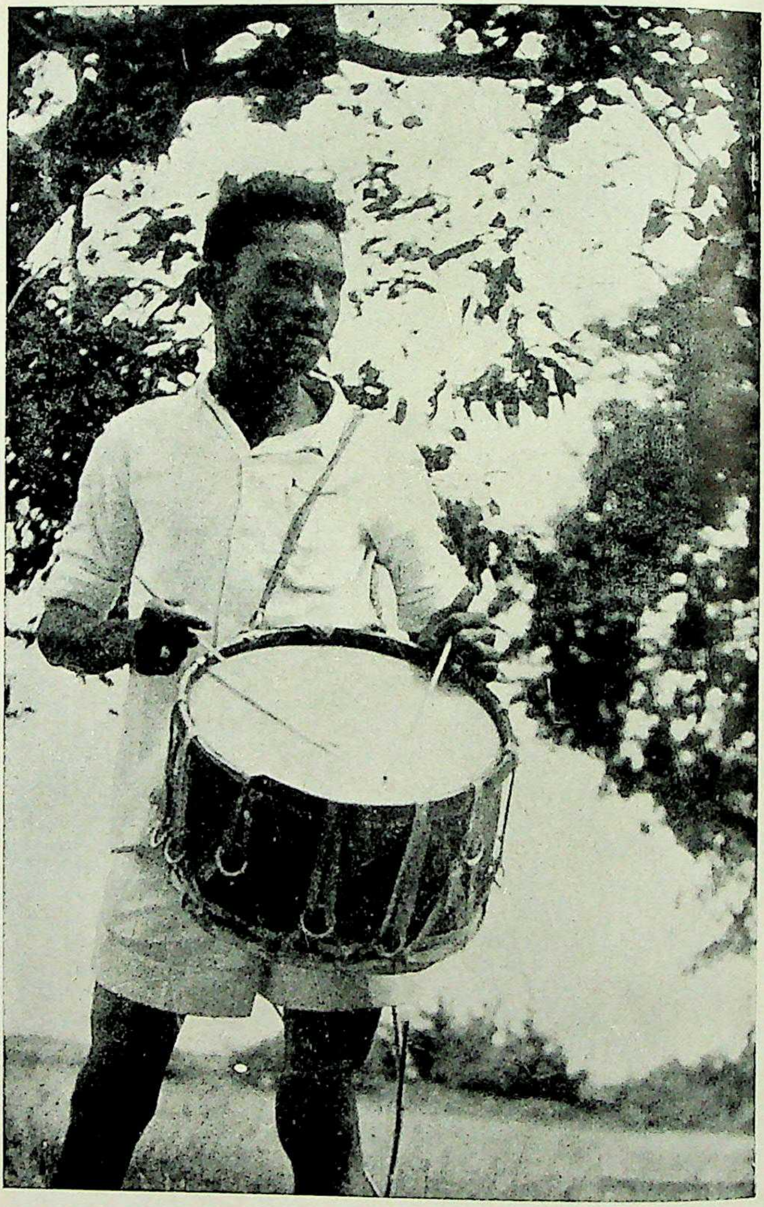

Fig 6.5. The *chadchadi*. Orissa.

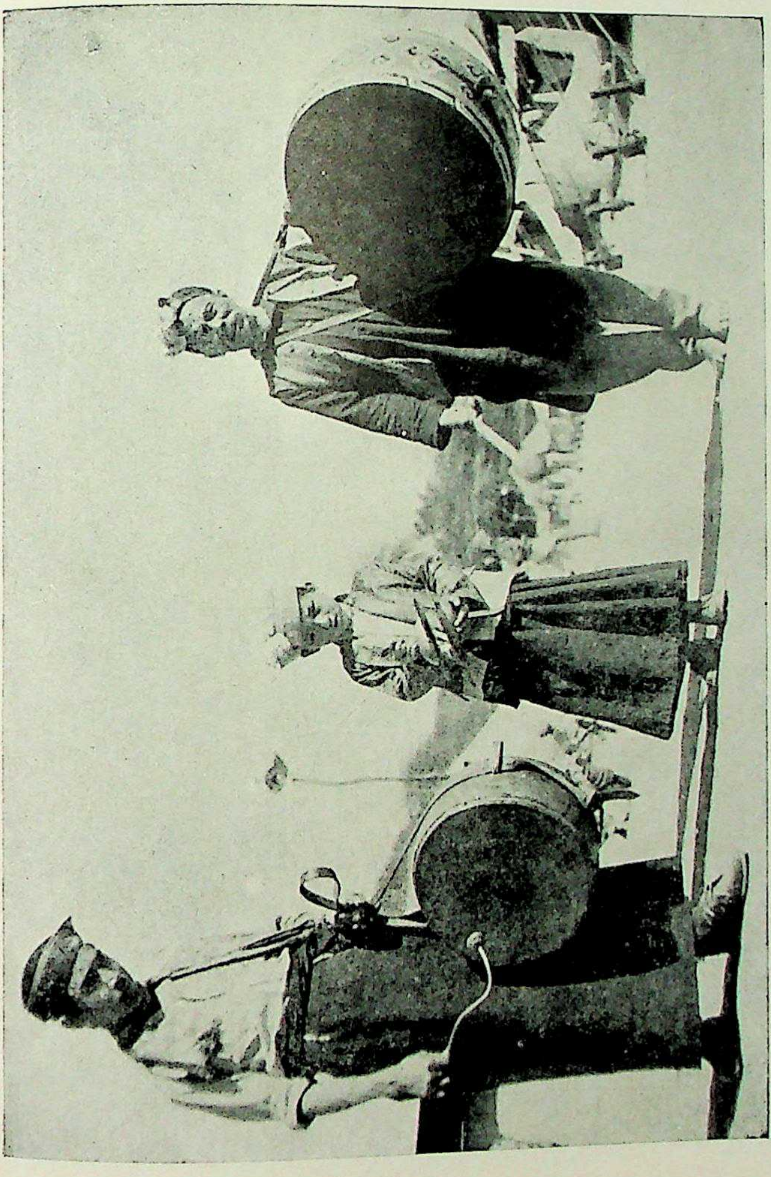

Fig. 6.6. The *gna.* Bhutan and Laddakh.

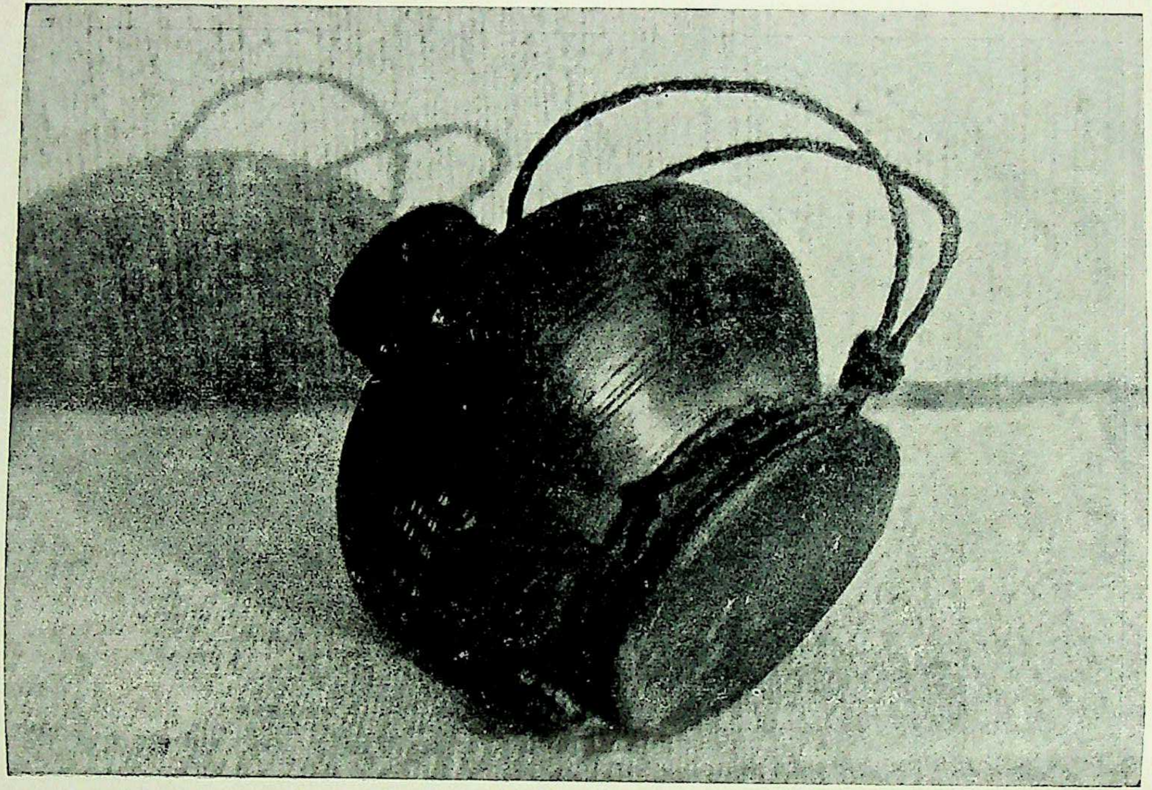

Fig. 6.7. The *ghumat*. Goa.

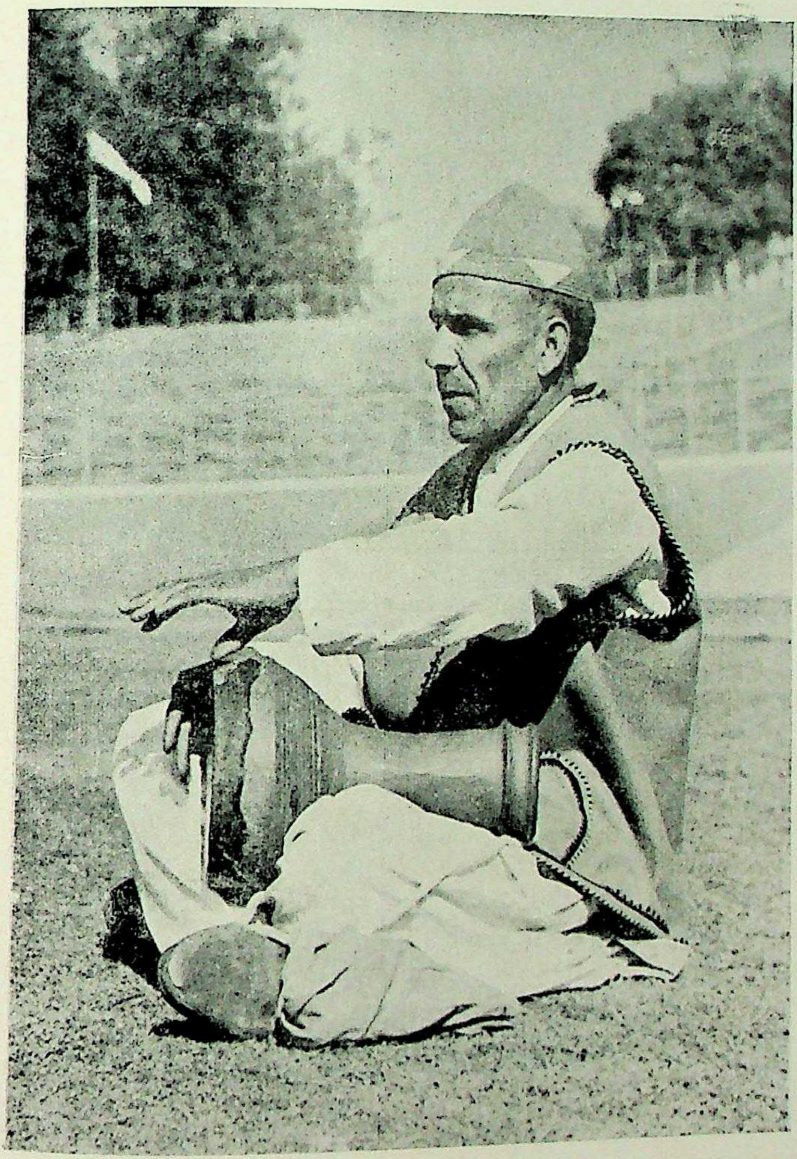

Fig. 6.8. The *tumbaknari*. Kashmir.

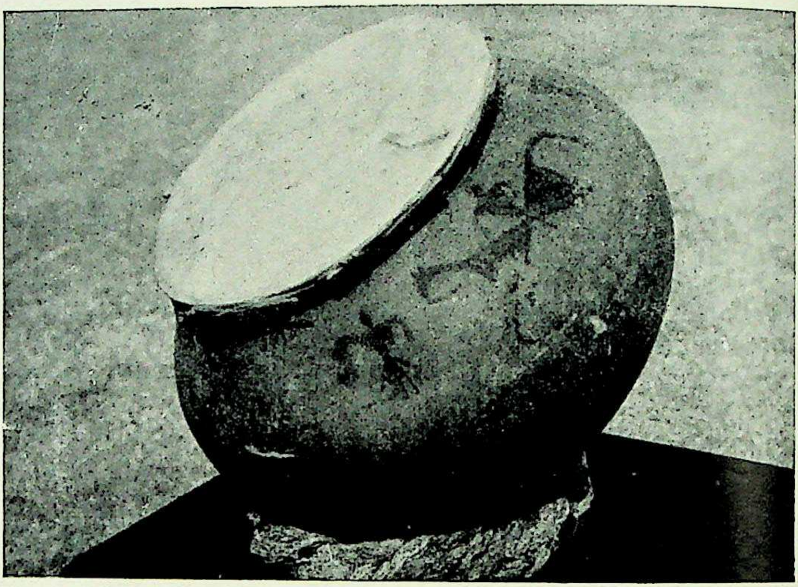

Fig. 6.9. The *pabuji ki mate*. Rajasthan.

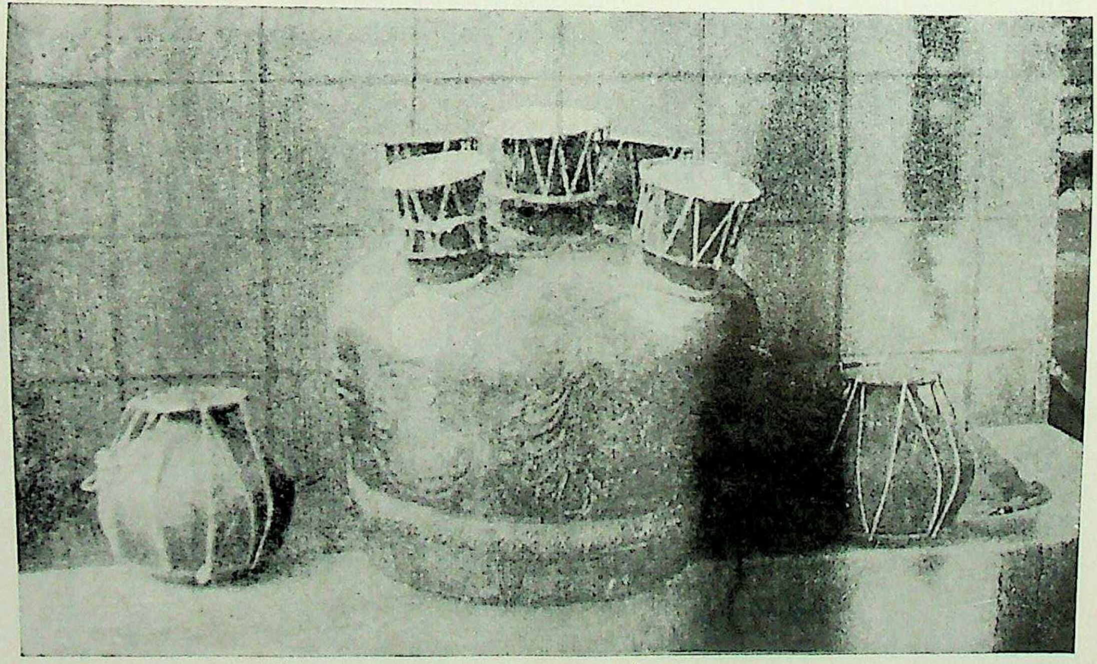

Fig.. 6.10. The *panchamukha vadya* (centre) and the *kudamuzha* on either side.

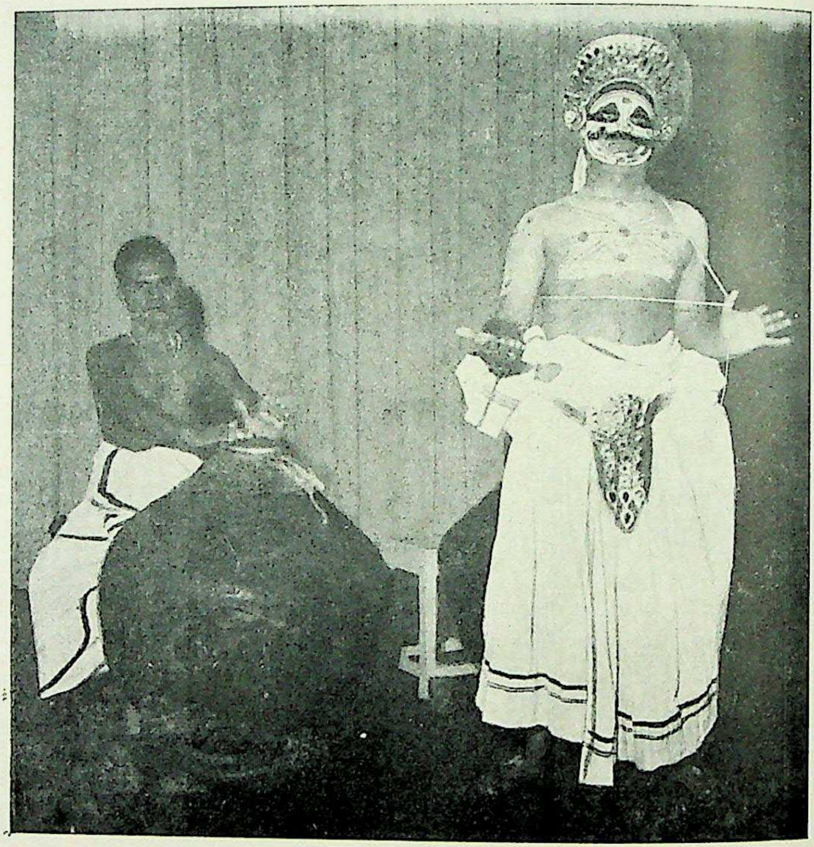

Fig. 6.11. The *mizhavu*. Kerala.

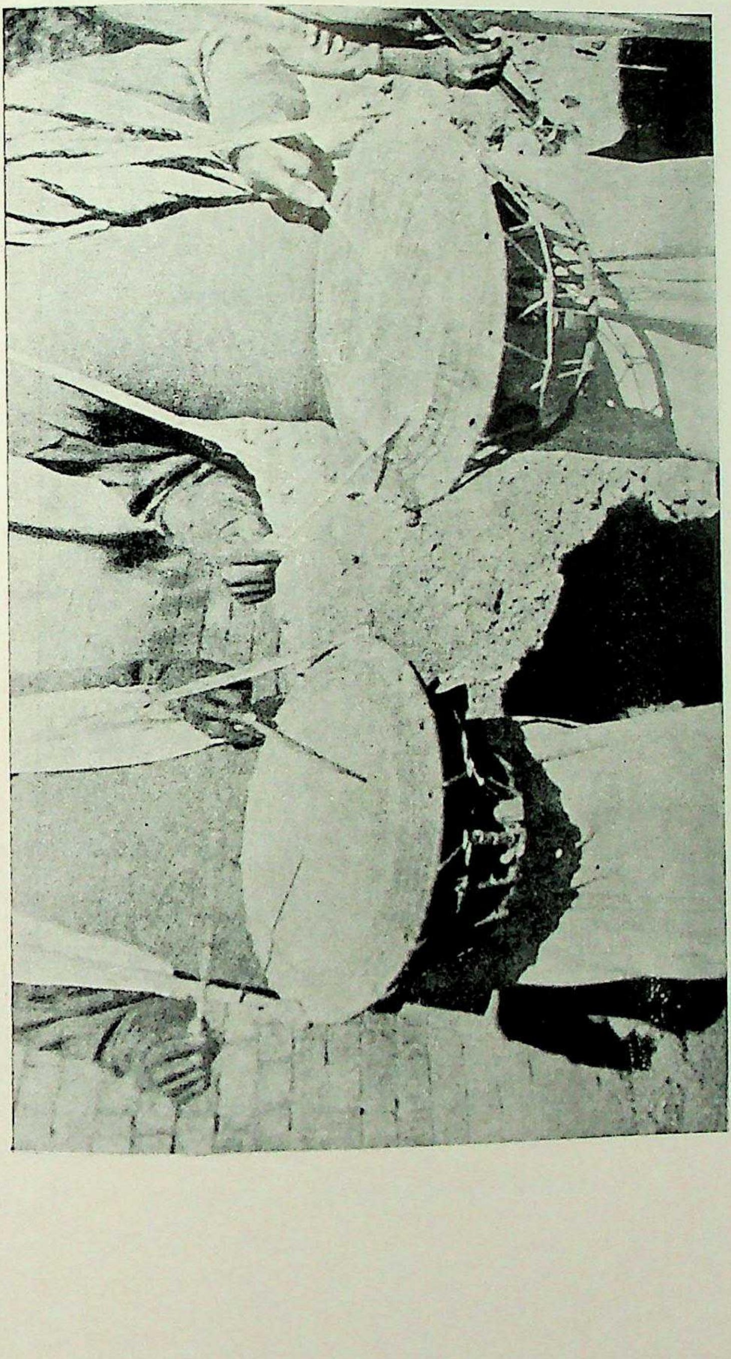

Fig. 6.12. The *tase*. Karnatak.

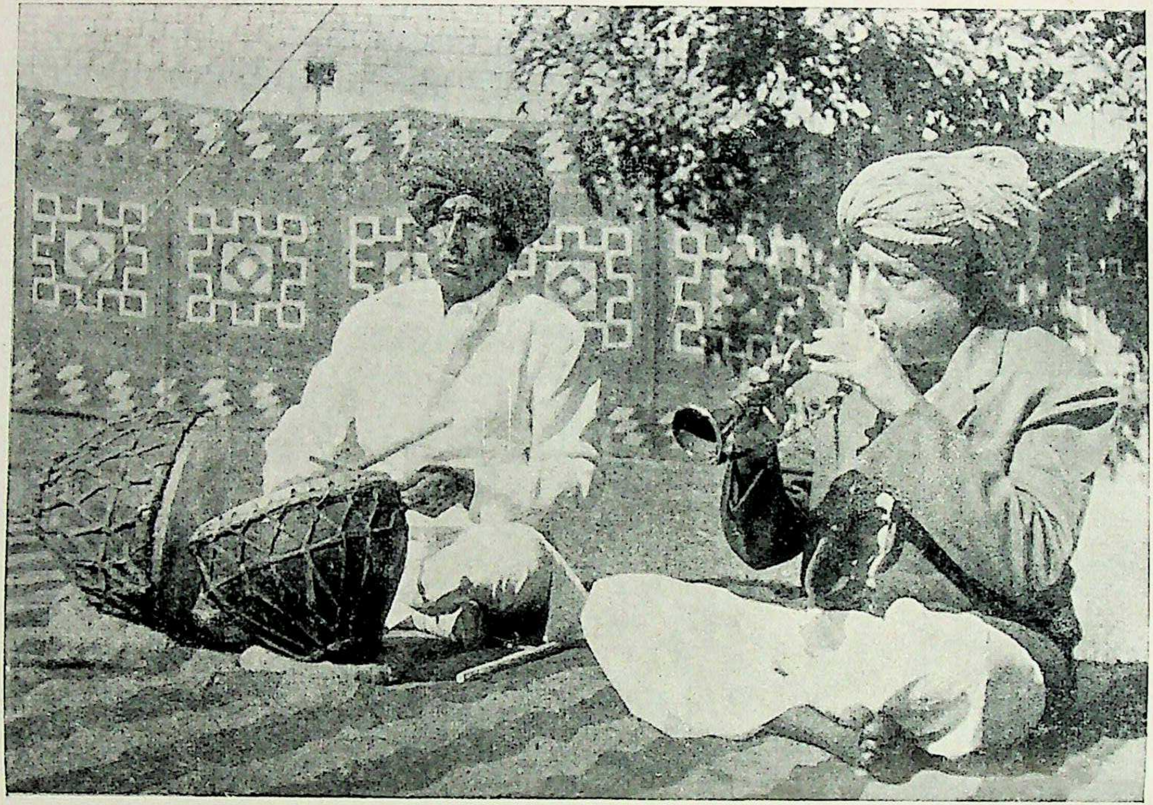

Fig. 6.13. The *nagara* (left) and the *shehnayi* (right). Rajasthan.

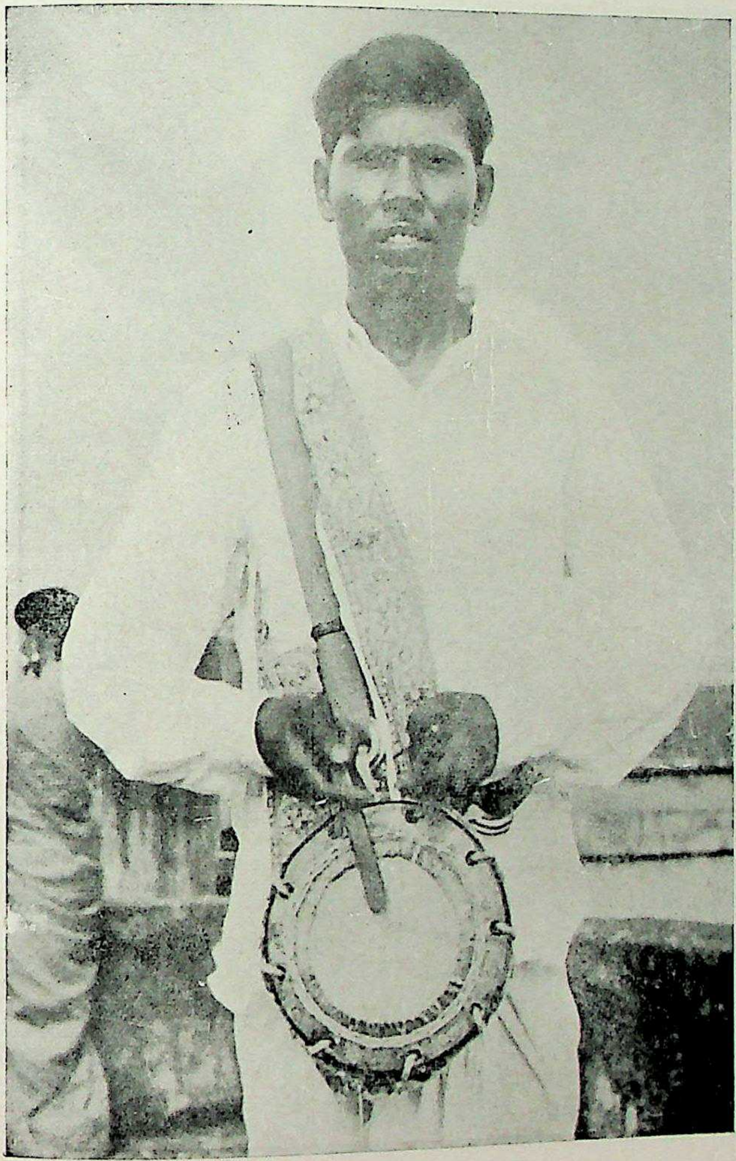

Fig. 6.14. The *tamukku.* Tamil Nadu.

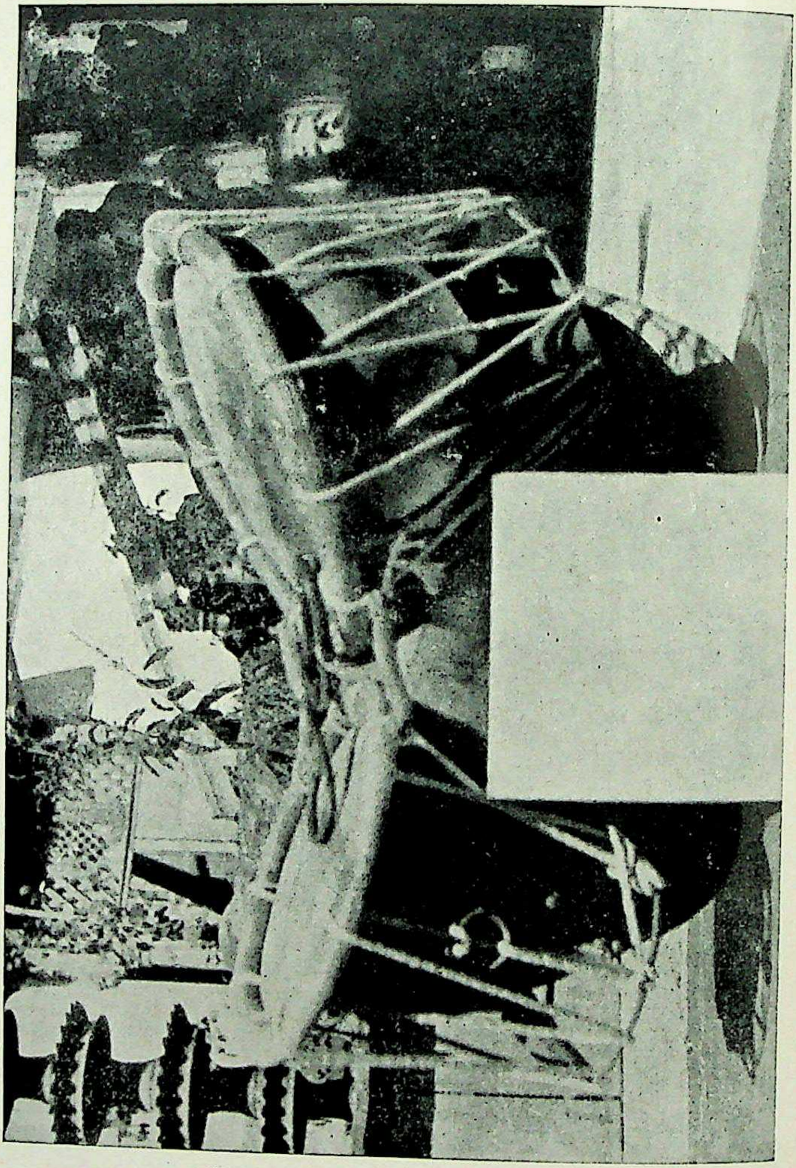

Fig. 6.15. The *sambal*. Maharashtra.

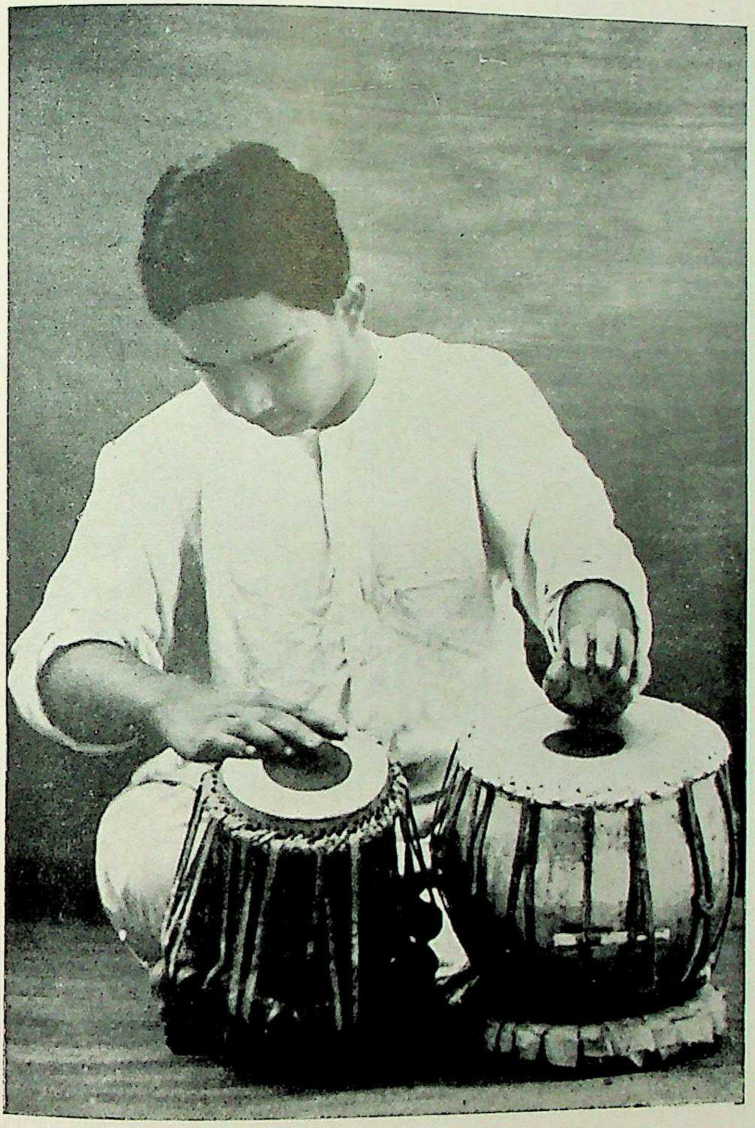

Fig. 6.16. The *tabla* (right) and *dagga* (left).

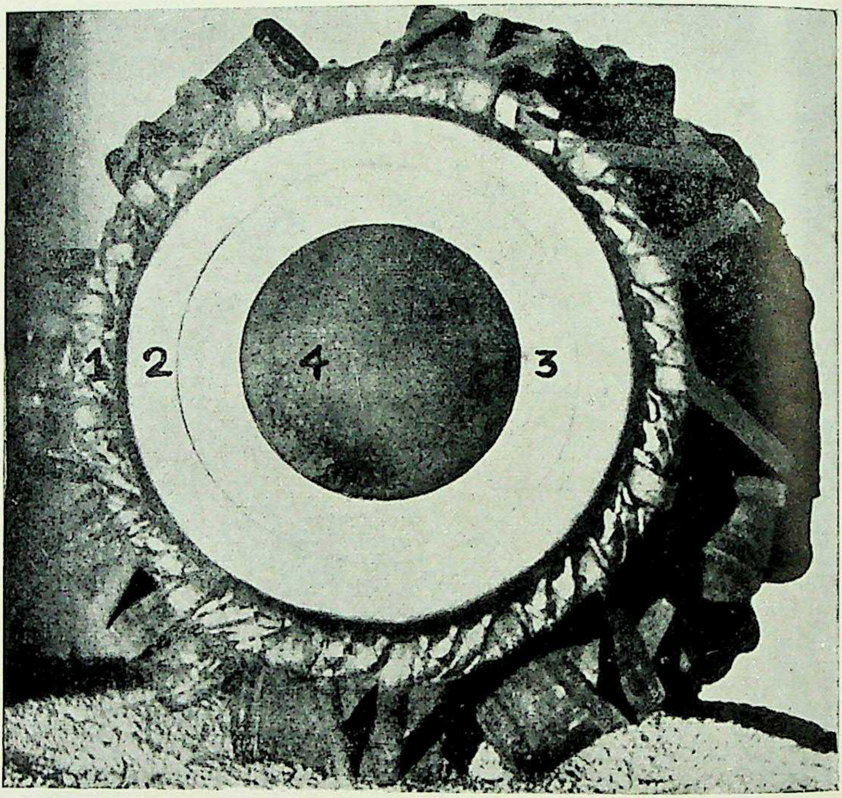

Fig 6.17. The *pudi* of *tabla* : 1. *singar*, 2. *kinar*, 3. *maidan*, 4. *syahi*.

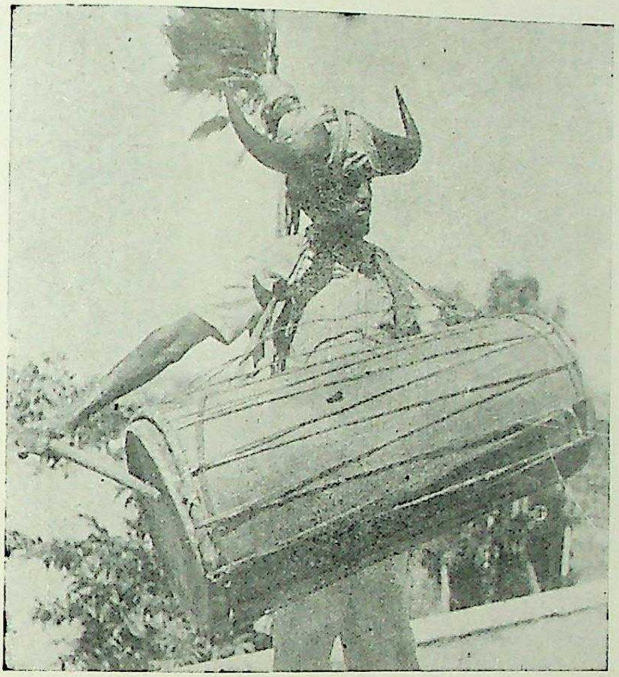

Fig. 6.18. The *dhol* of Reddis, Andhra

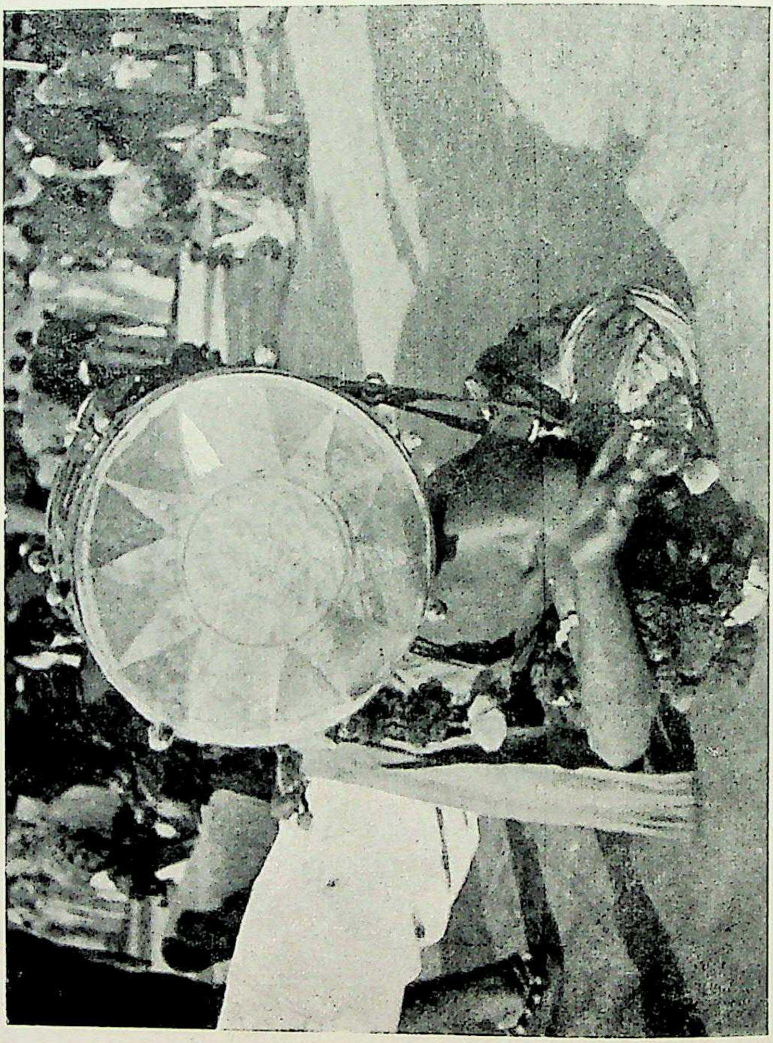

Fig. 6.19. The *dhol* of Dhangars. Maharashtra.

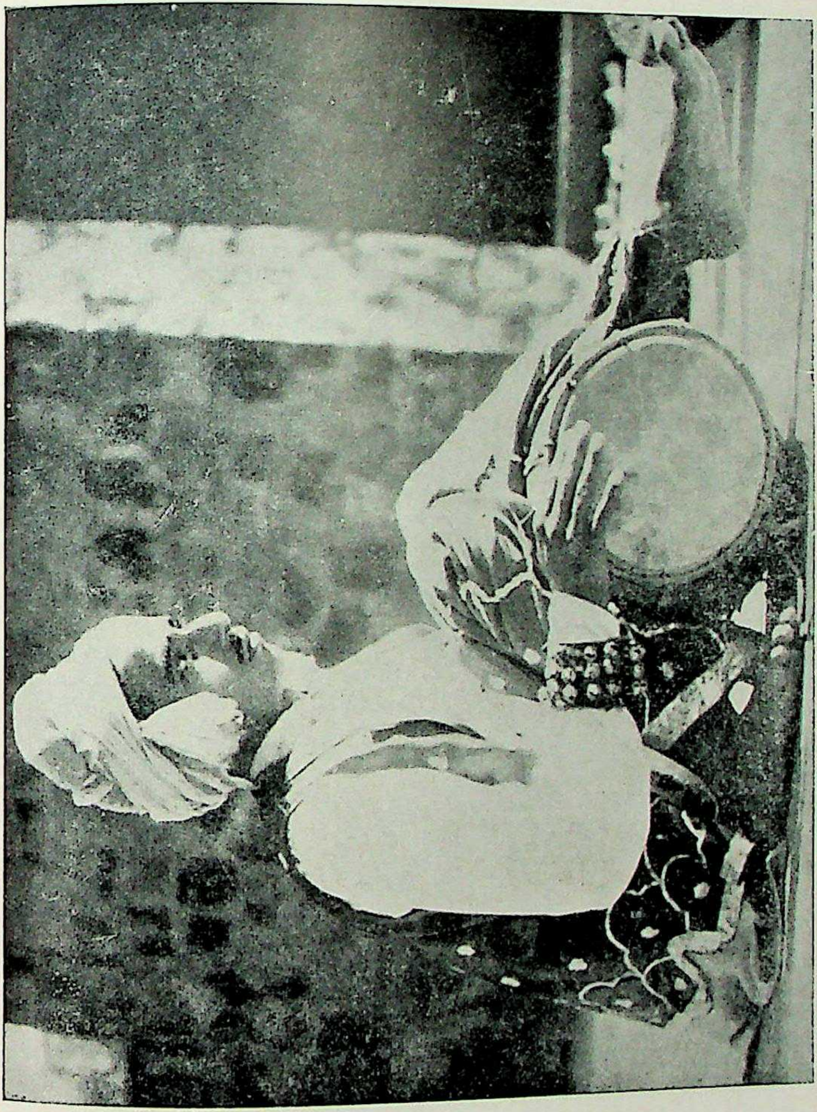

Fig. 6.20. The *dholak*. Punjab.

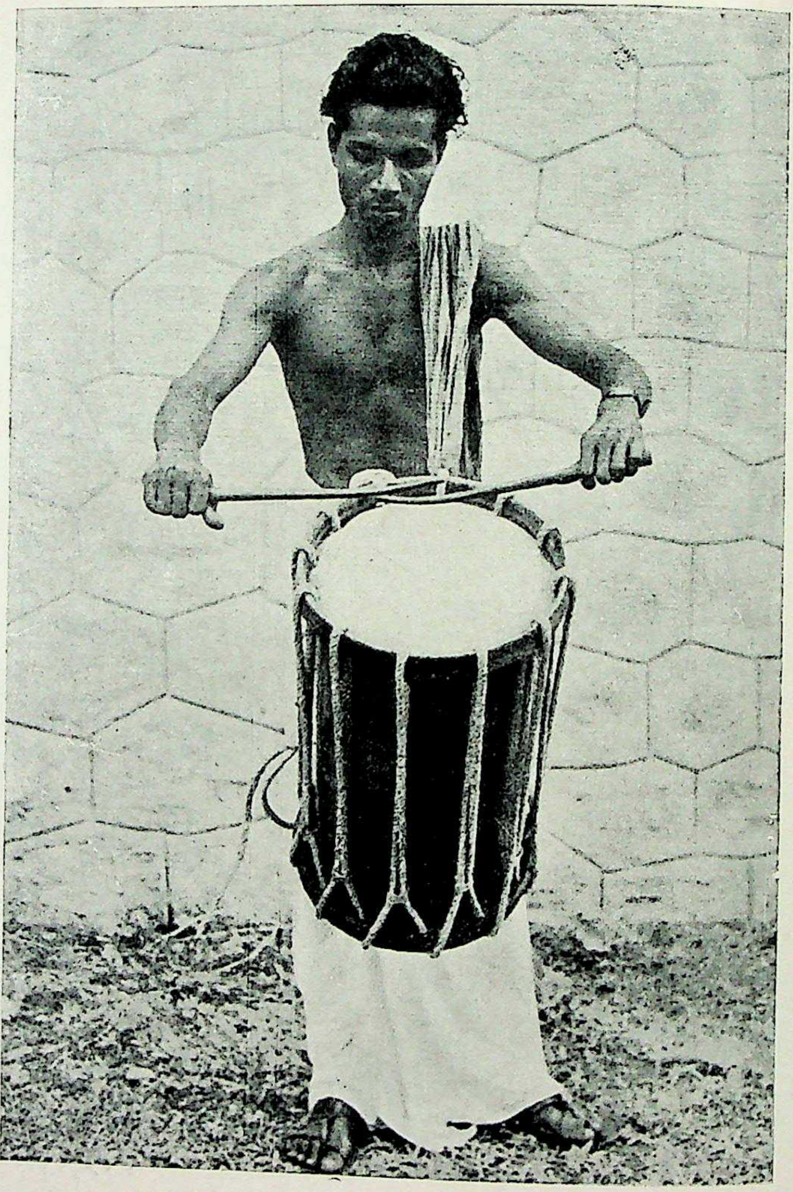

Fig. 6.21. The *chenda*. Kerala.

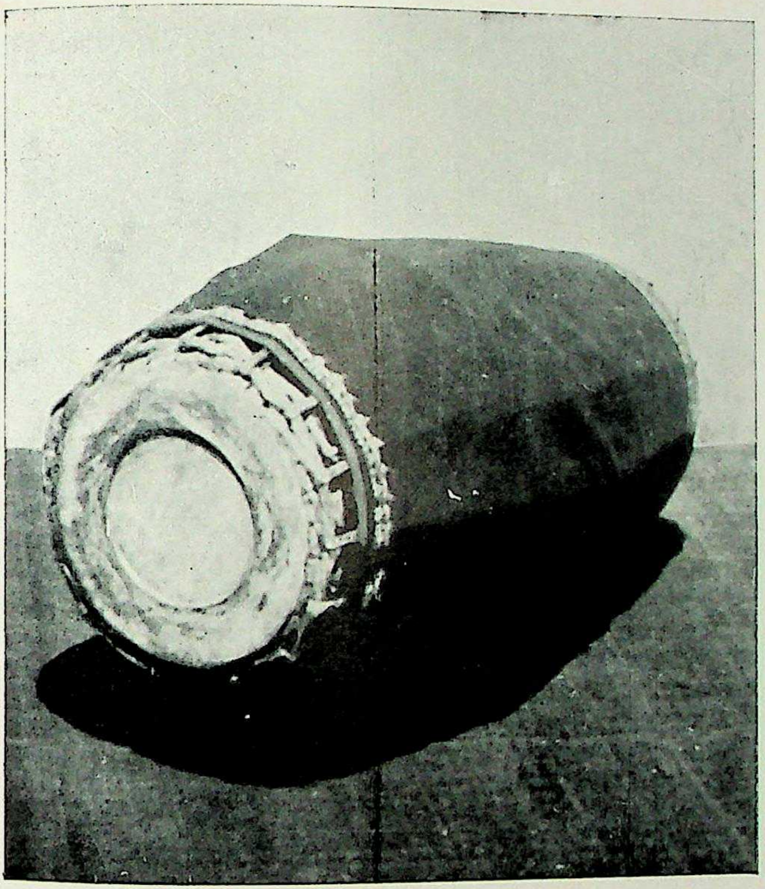

Fig. 6.22. The *mridangam.* South India.

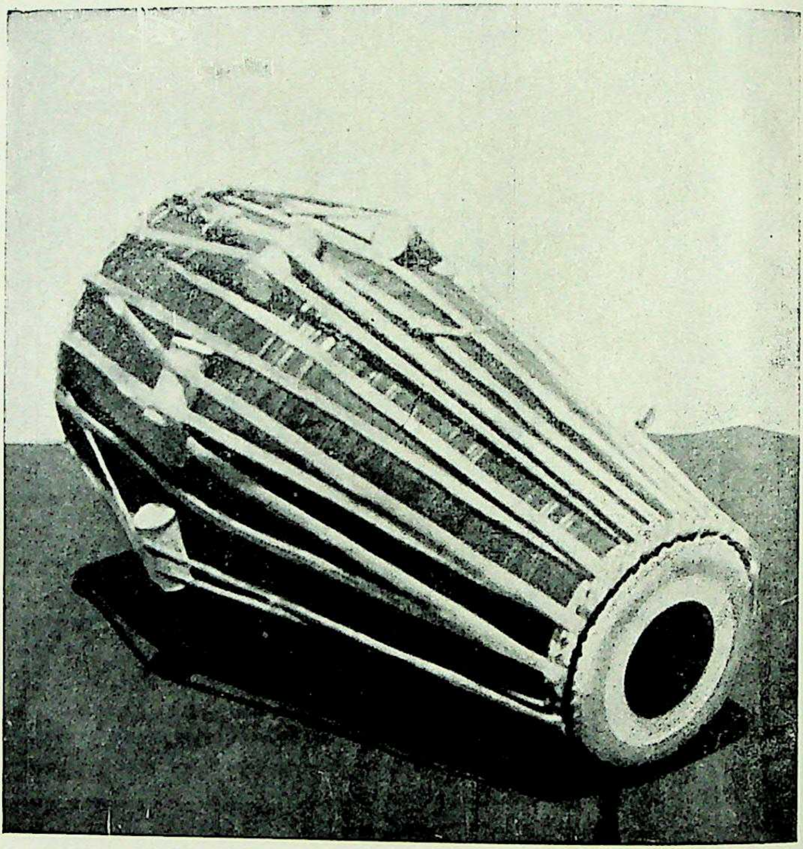

Fig. 6.23. The *pakhavaj*. North India.

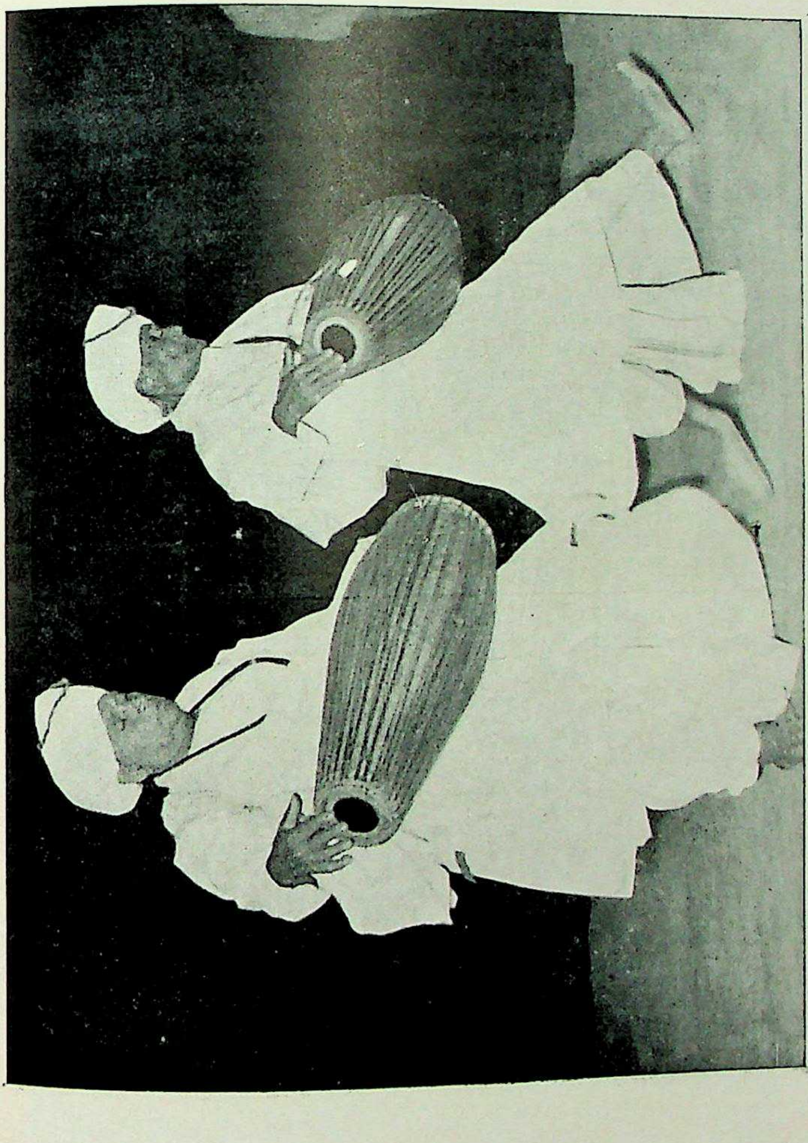

Fig. 6.24. The *sri-khol*. Bengal.

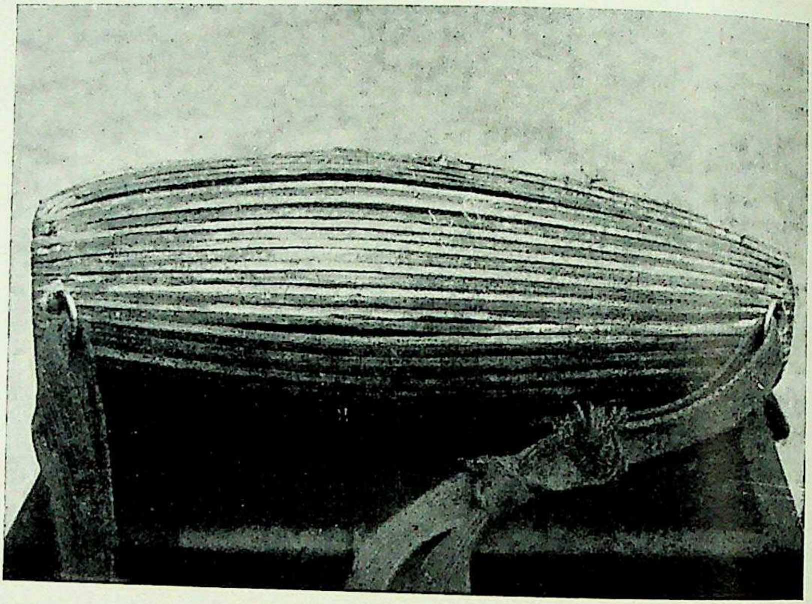

Fig. 6.25. The *pung*. Manipur.

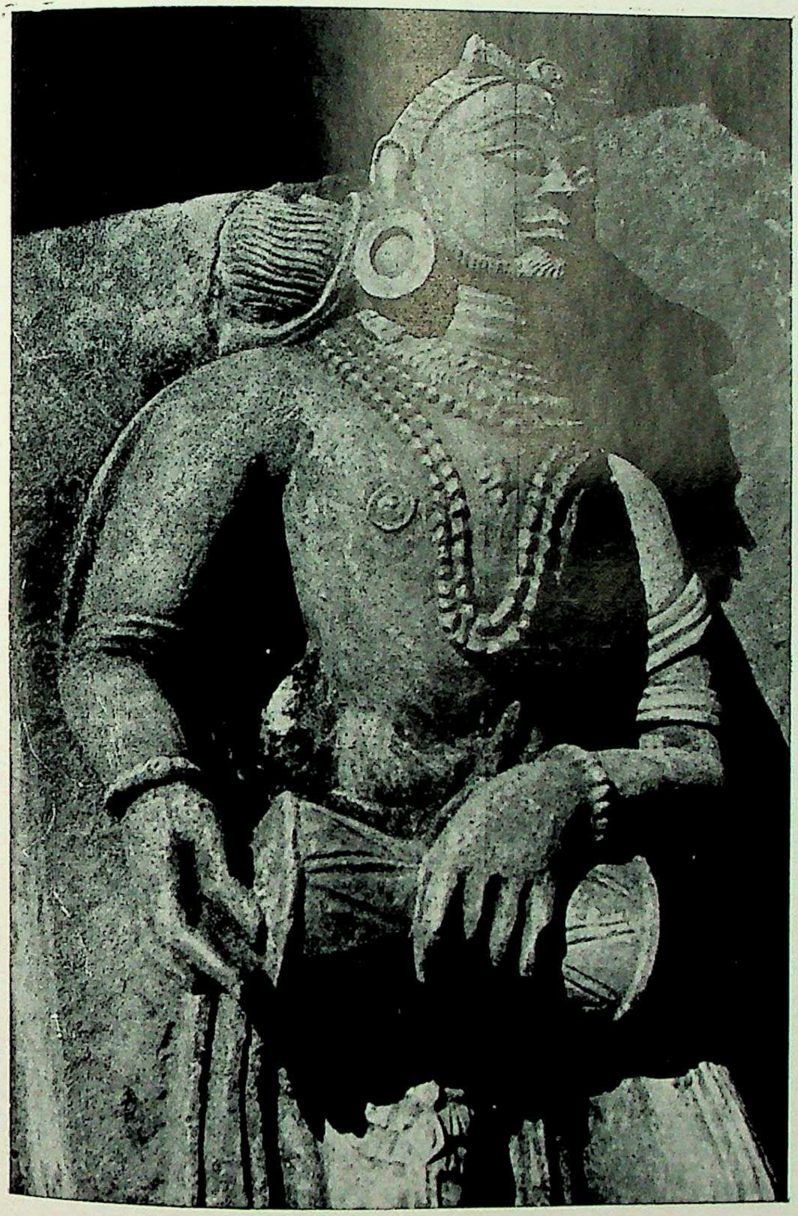

Fig. 6.26. The *hudakka*. Markand, 9th Cent. A.D.

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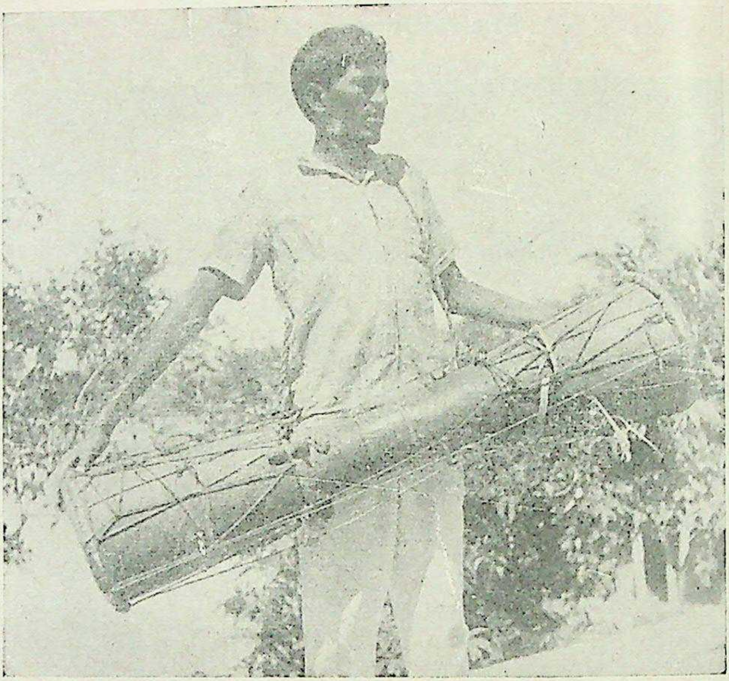

Fig. 6.27. The *abzem*. Andhra.

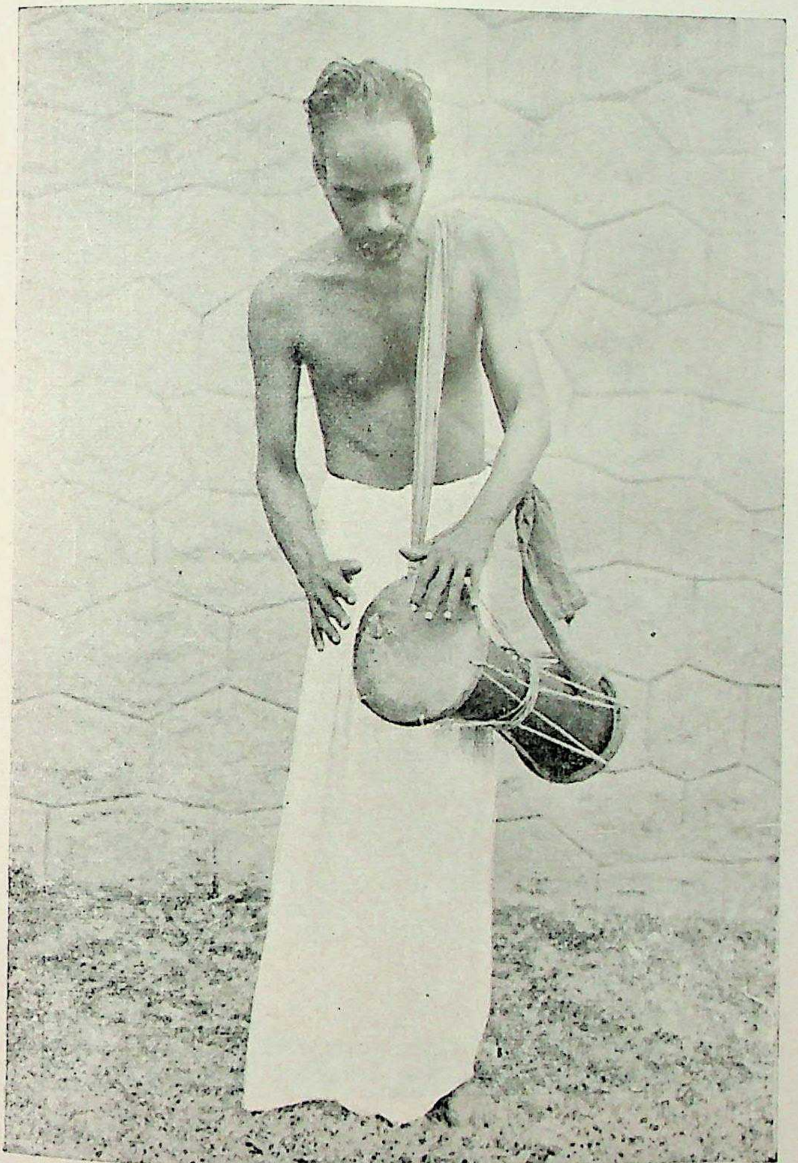

Fig 6.28. The *timila*. Kerala.

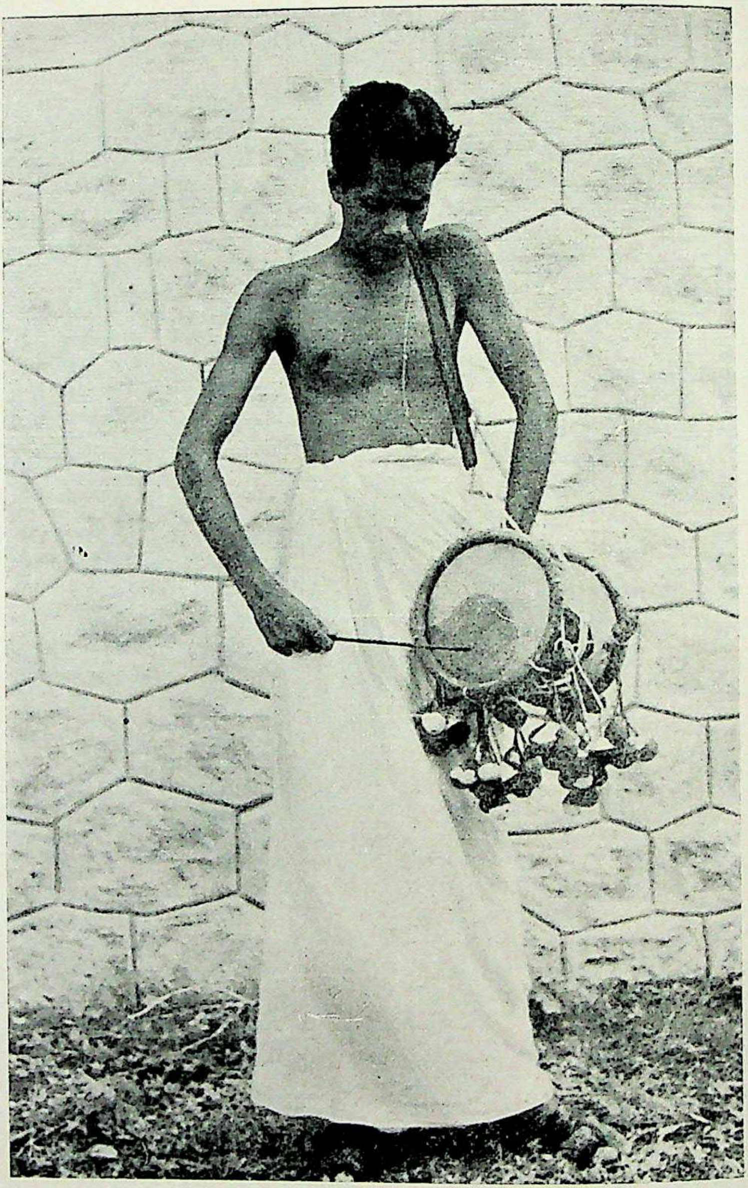

Fig. 6.29. The *idakka*. Kerala.

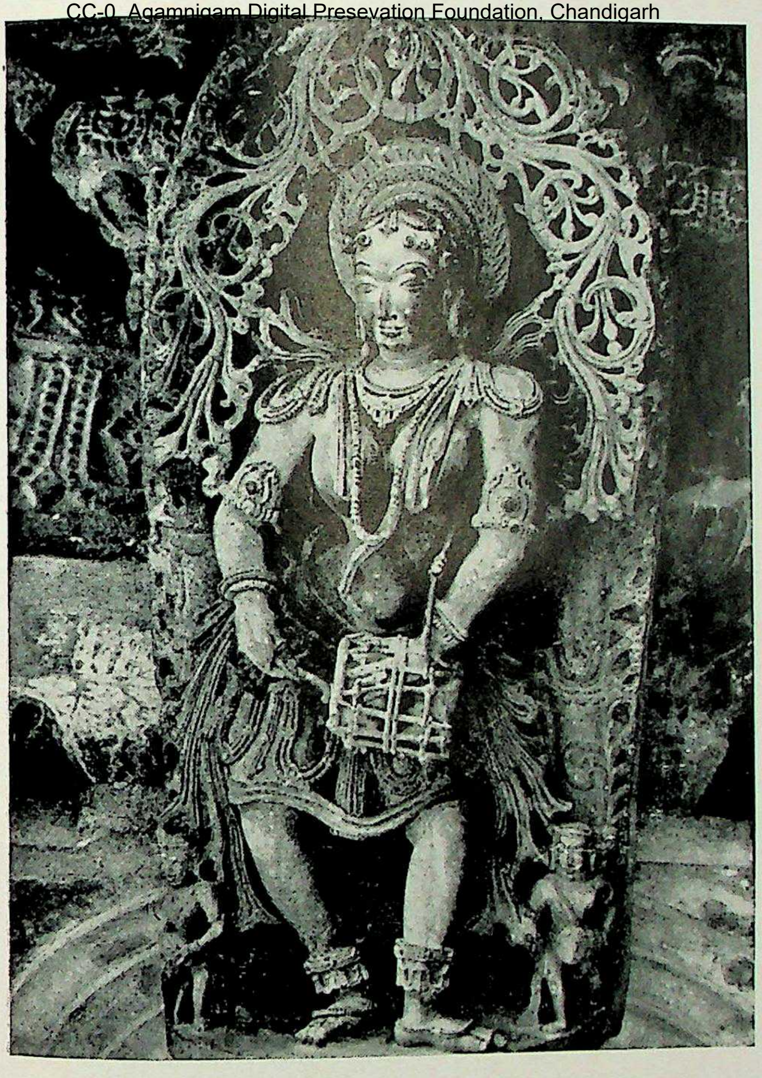

Fig. 6.30. An ancient variety of *idakka*. Perhaps an *avuj*. Belur (Karnatak). 13th Cent. A.D.

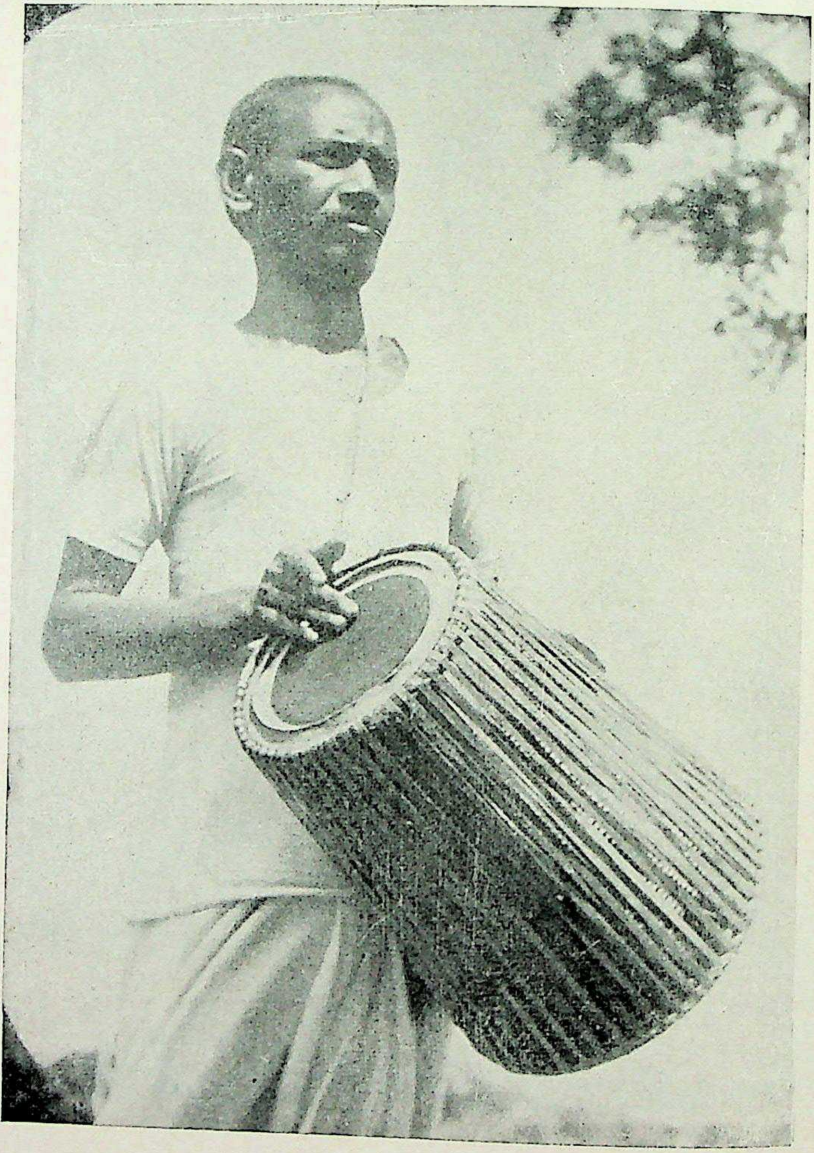

Fig. 6.31. The *tumda* (or *madal*). Orissa.

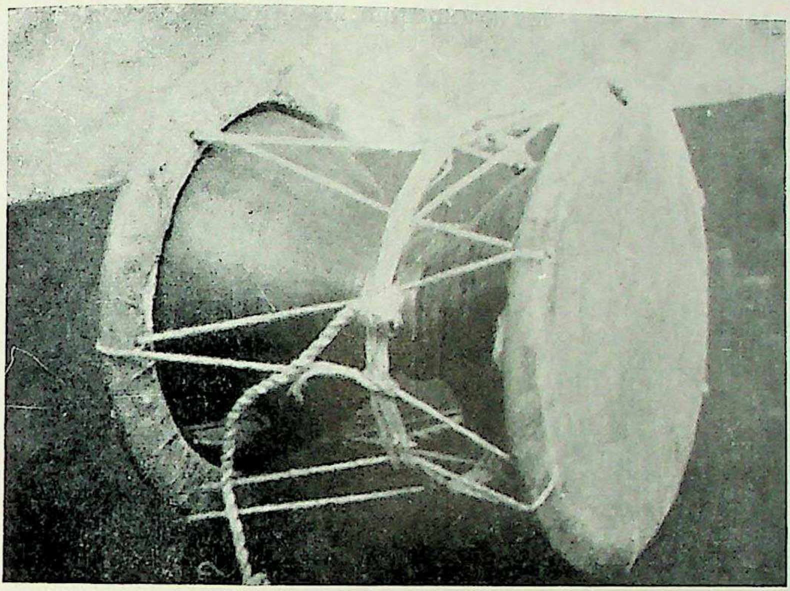

Fig.. 6.32. The *damaru.*

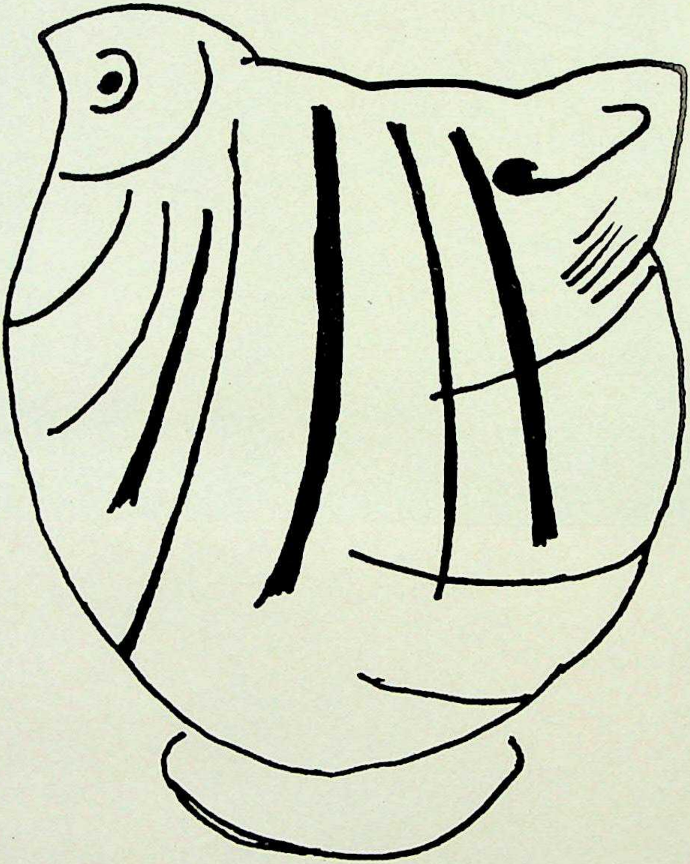

Fig. 7.1. A bird whistle of clay. Chanhu dado. Prehistoric.

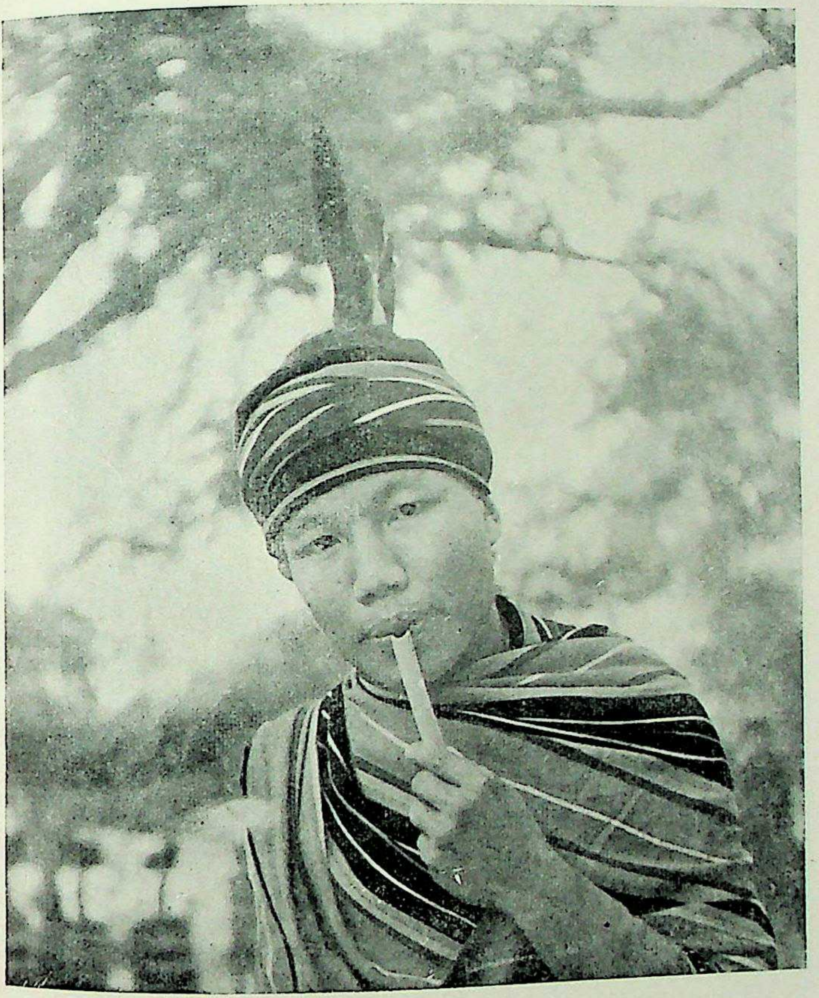

Fig. 7.2. The *pheple*. Manipur.

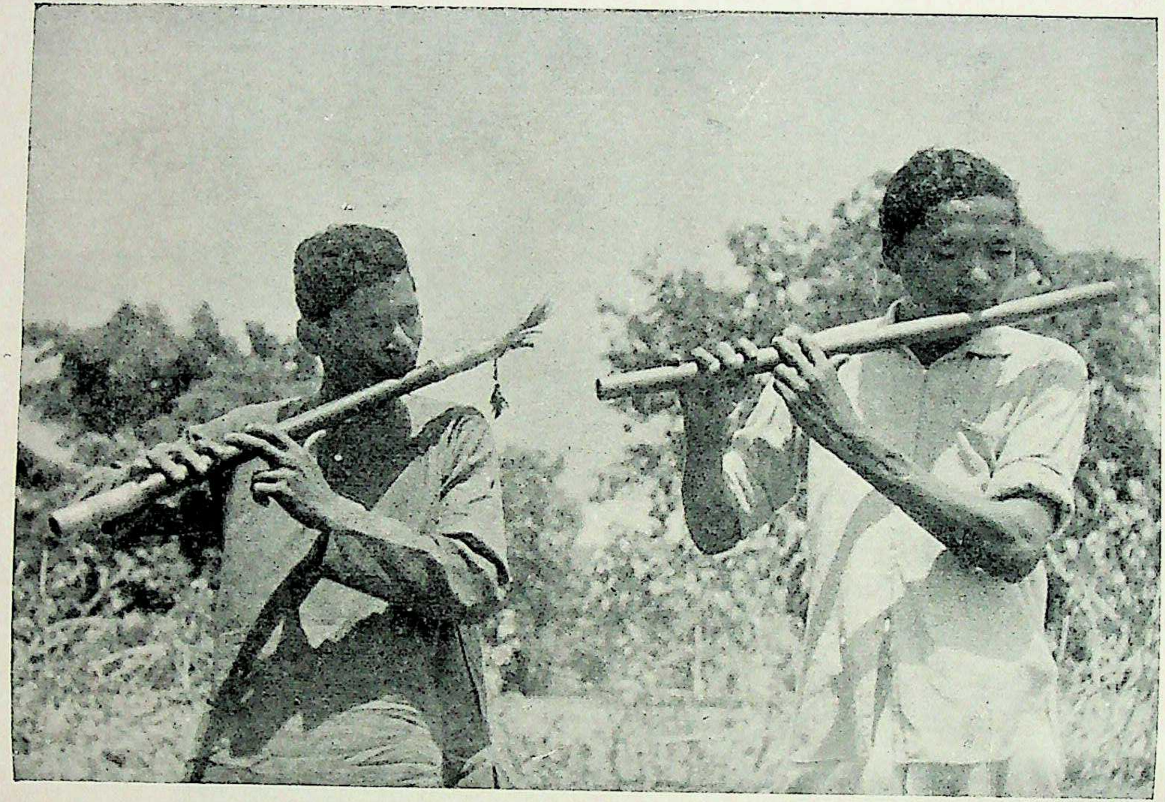

Fig. 7.3. The *tirayu* of the Santhals. Orissa.

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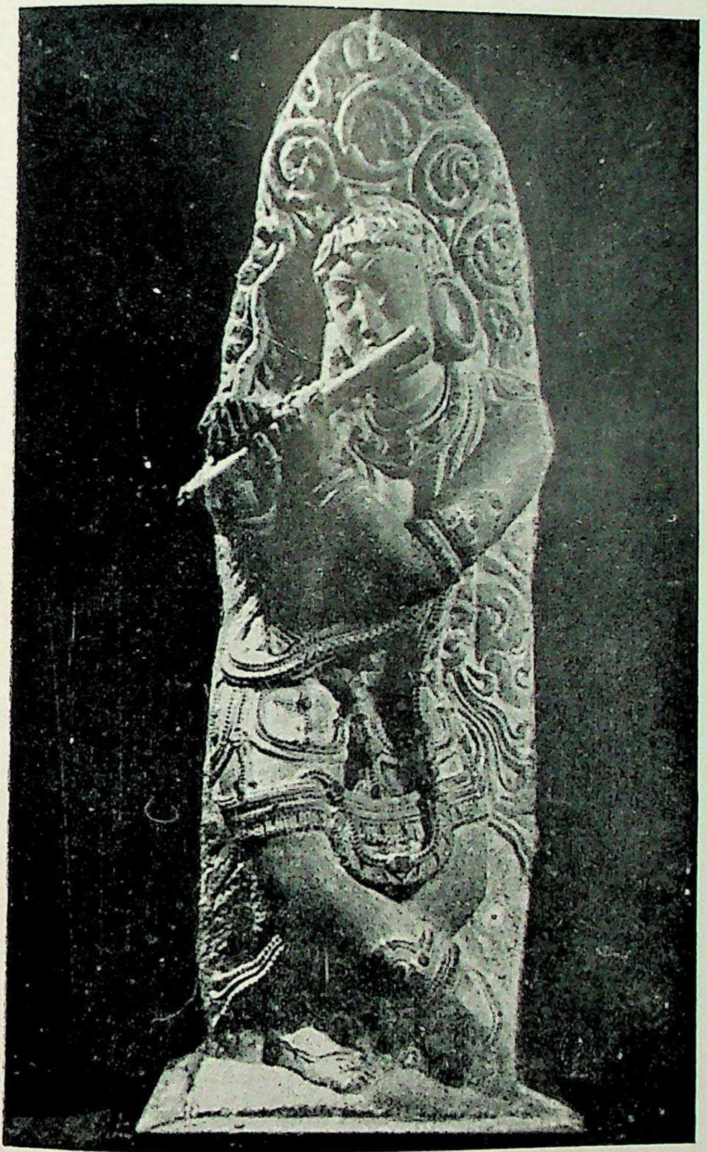

Fig. 7.4. The pastoral horizontal flute of Lord Krishna.
Kolhapur museum.

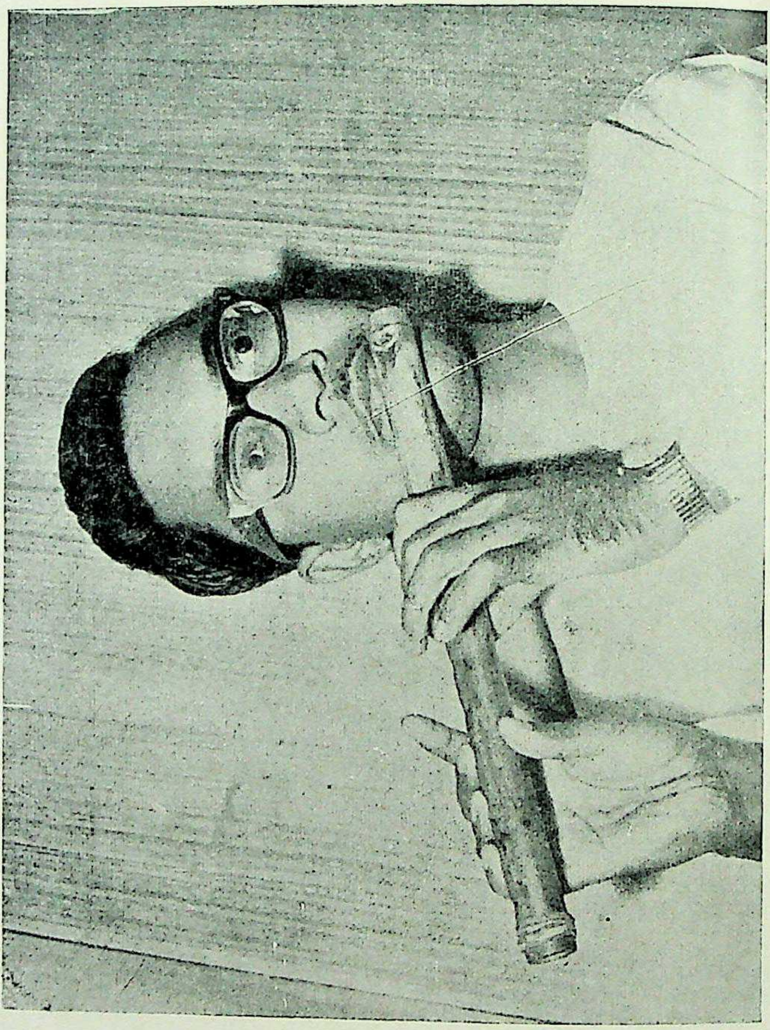

Fig. 7.5. The horizontal concert flute. South India.

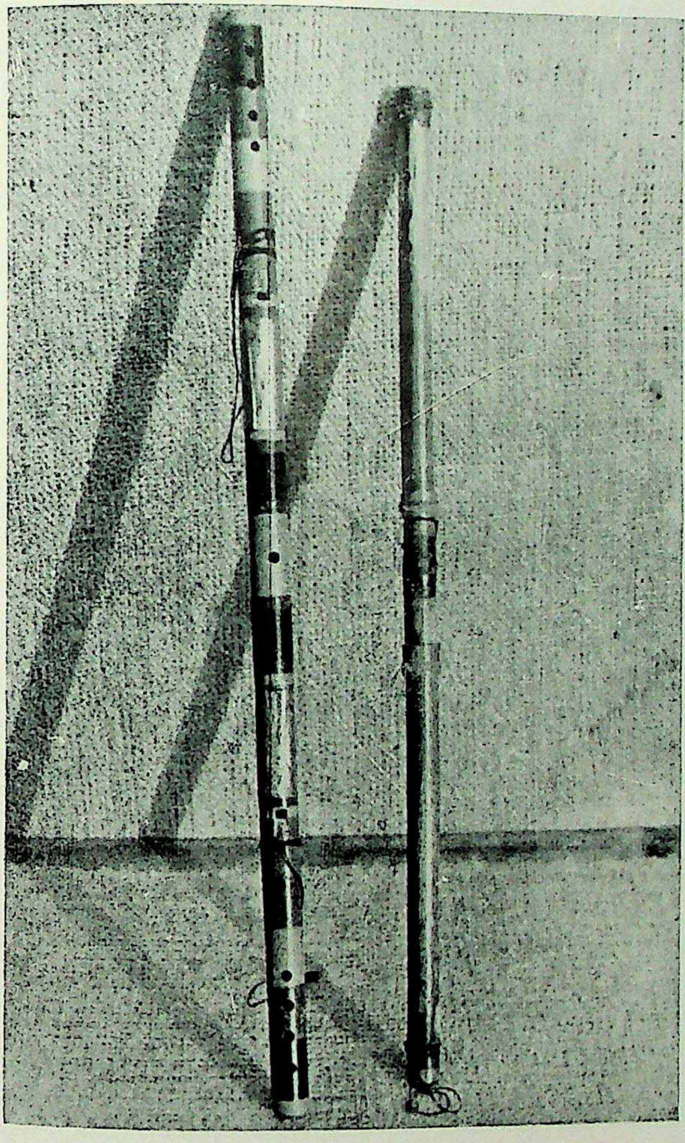

Fig. 7.6. The *jode pavo* of Gujarat (left) and the *jod bandi bansuri* of Orissa (right).

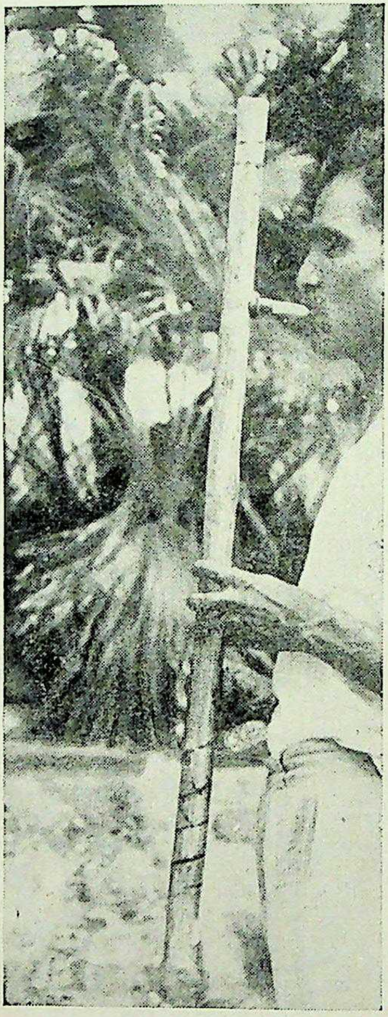

Fig. 7.7. The *nedun kuzhal*. Tamil Nadu (The player is a north Indian).

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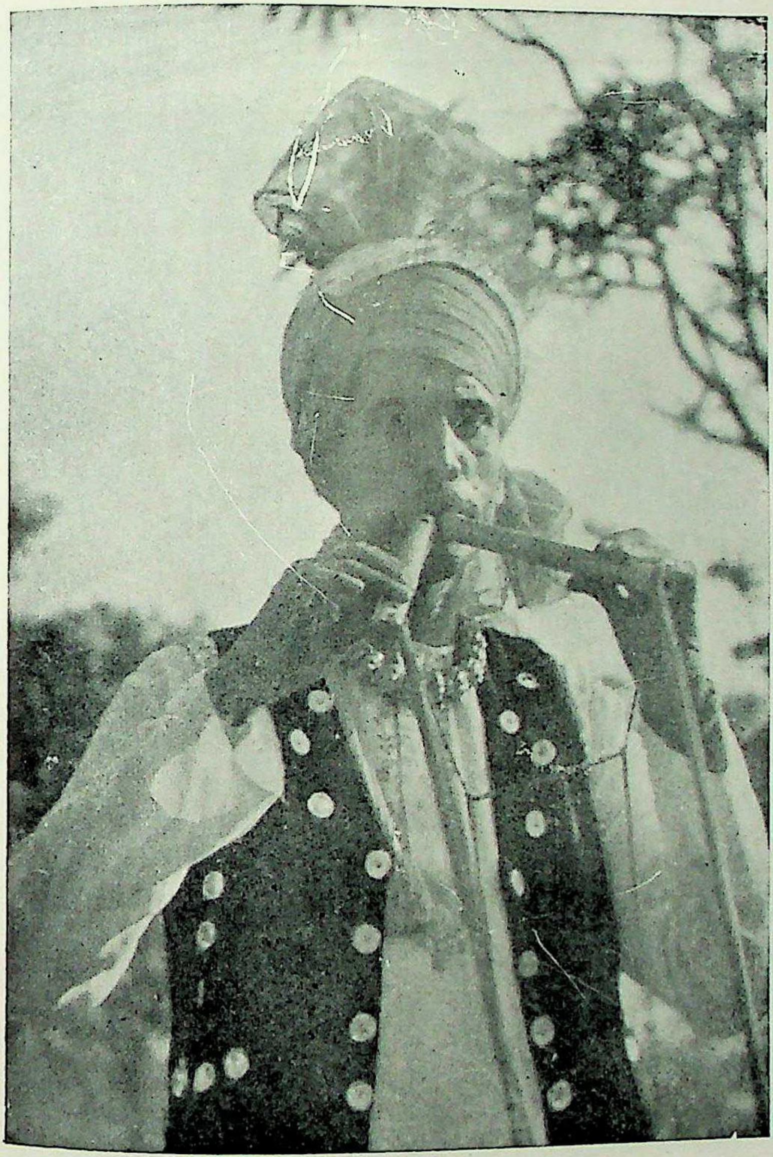

Fig. 7.8. The *algoza.* Punjab.

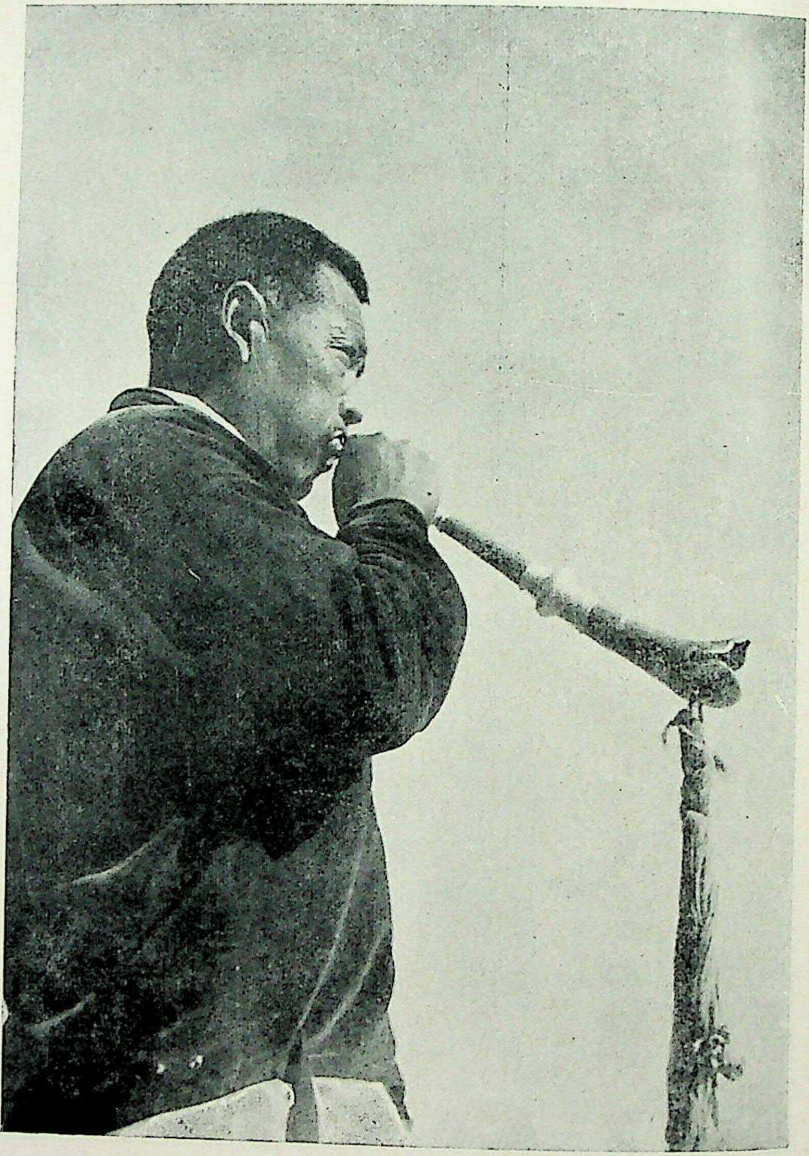

Fig. 7.9. The *khangling*. Bhutan and Laddakh.

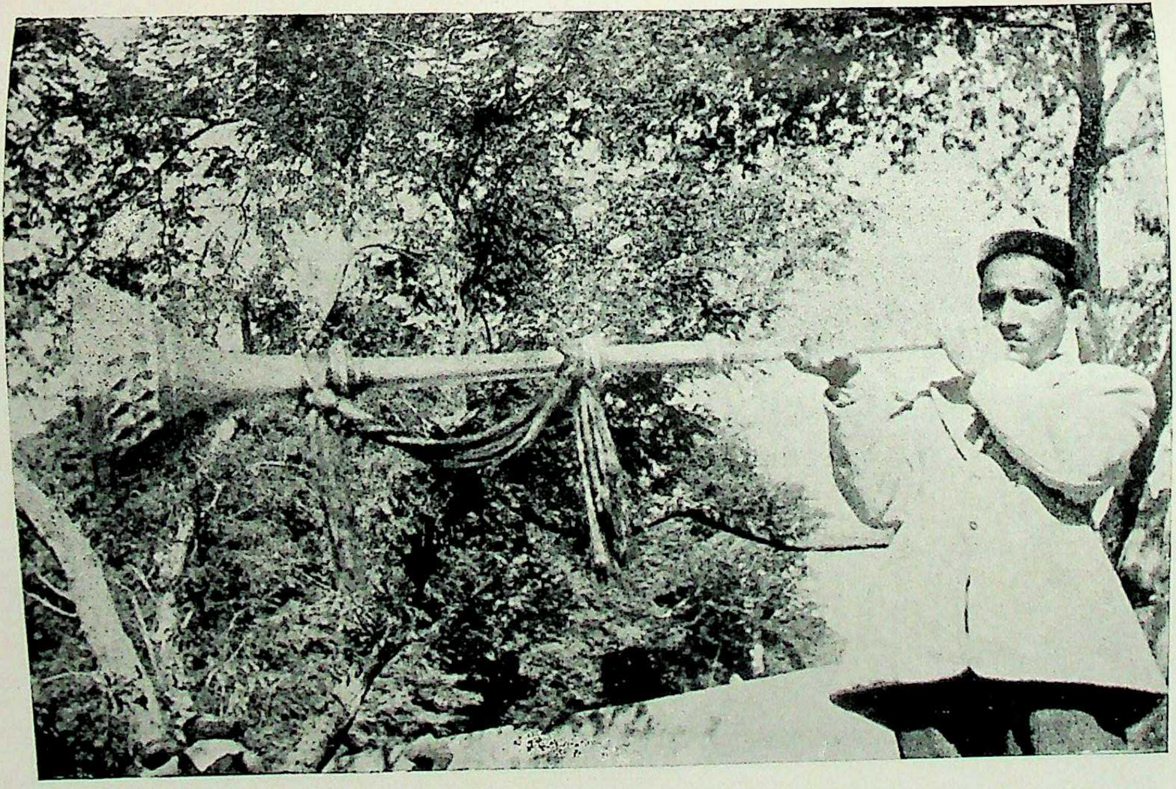

Fig. 7.10. The *karna*. Himachal Pradesh.

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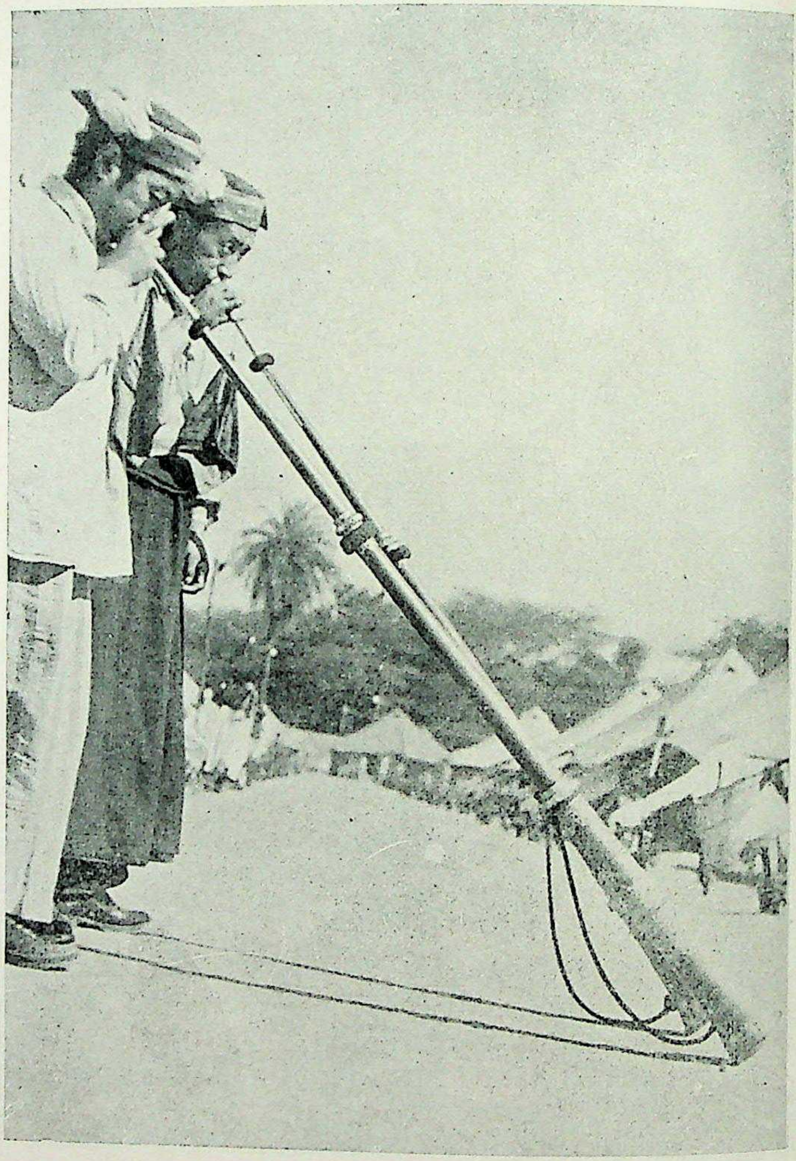

Fig. 7.11. The *thunchen*. Bhutan and Laddakh.

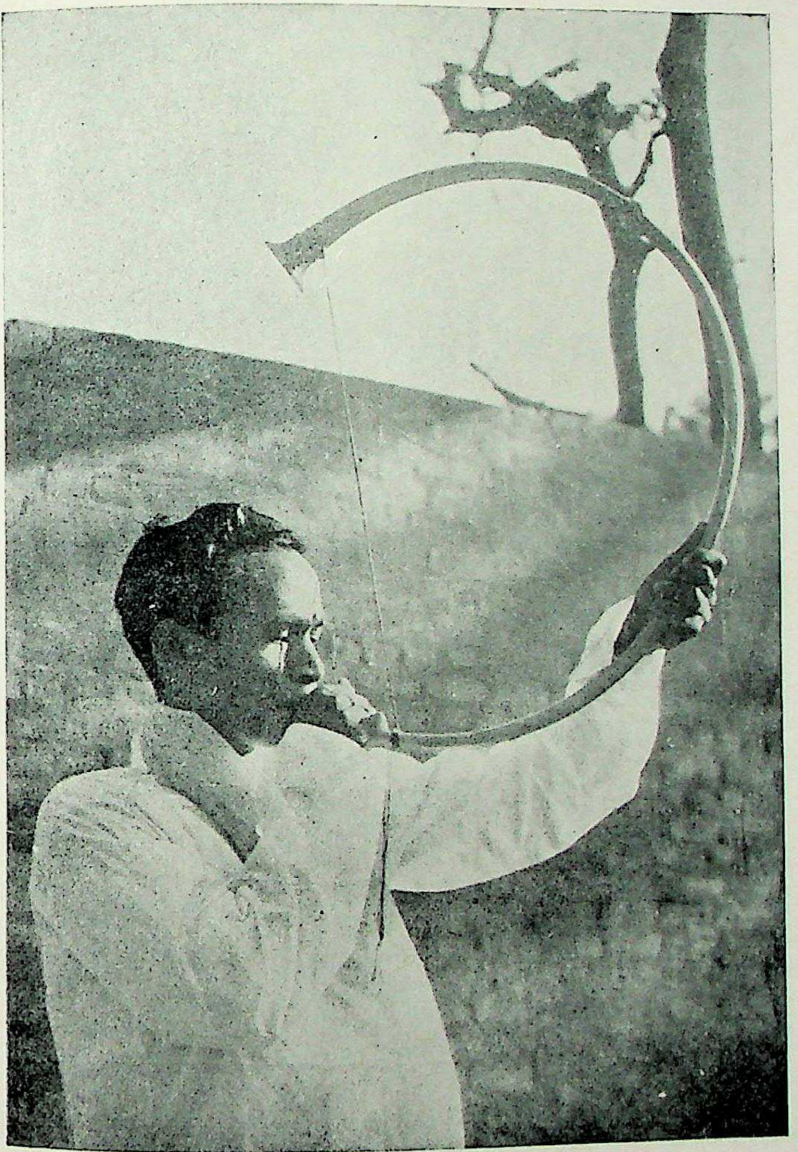

Fig. 7.12. The *kombu.* South India.

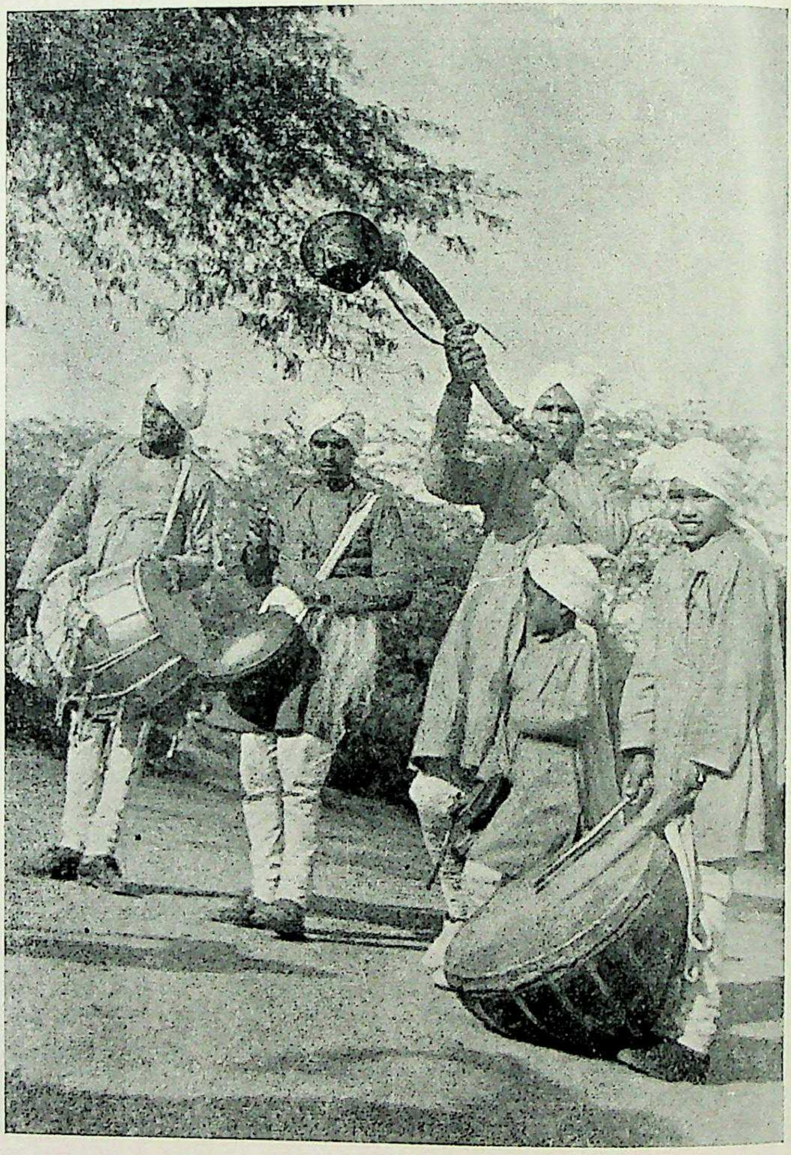

Fig. 7.13. The *ransinga* in the centre. Other instruments are (left to right) : *dhol*, *tasha (dama)*, *thali* and the *nagara*.

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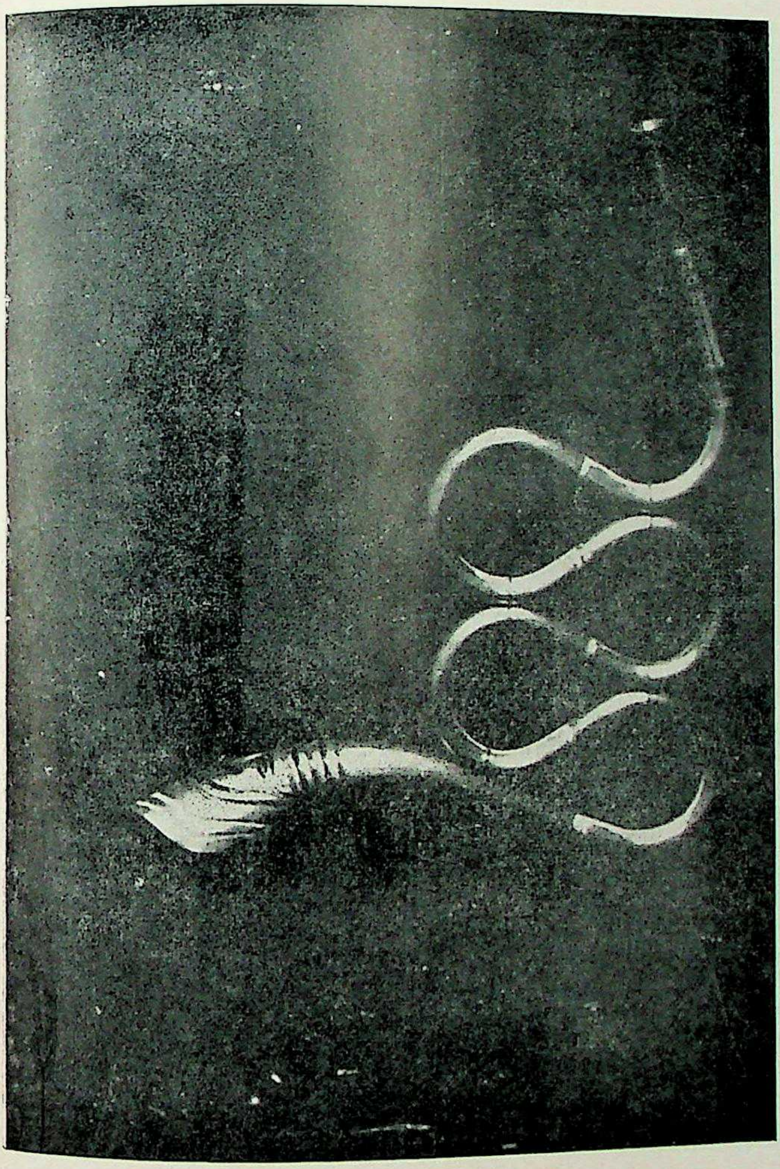

Fig. 7.14. The *nagphani*. Gujarat.

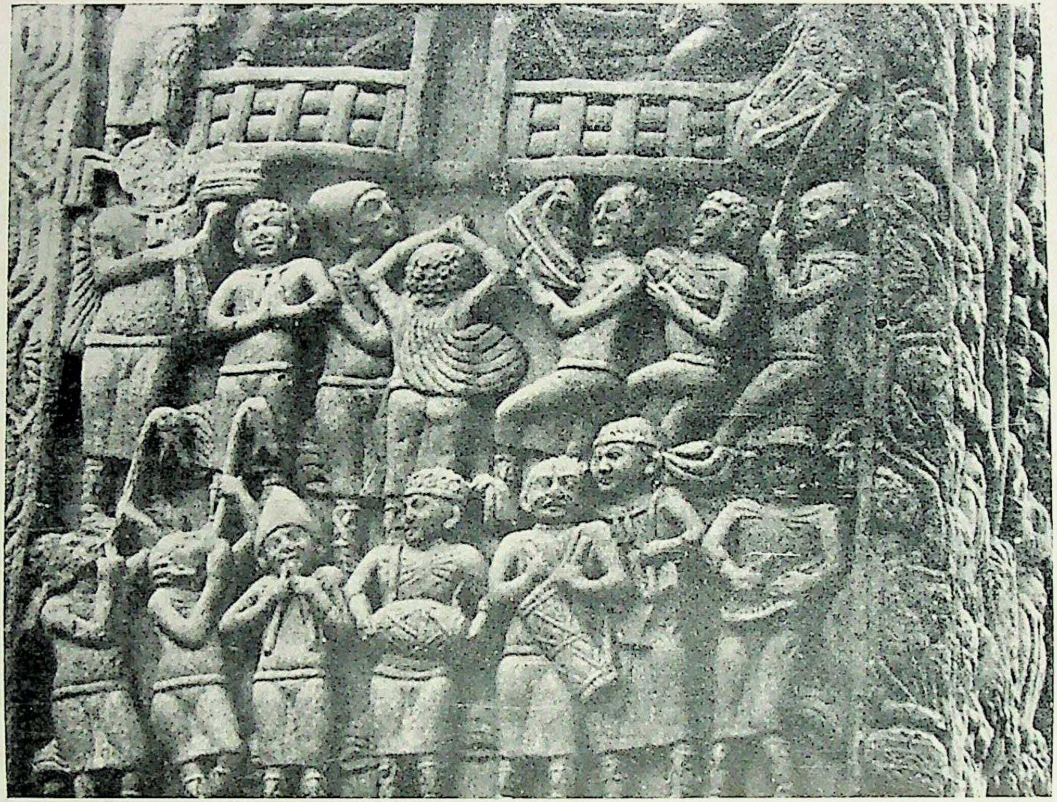

Fig. 7.15. A pair of trumpets on the left and then the *algoza*. Note the bulging and cylindrical drums as well as the portable dulcimer (at the right). Sanchi. 3rd Cent. B.C.

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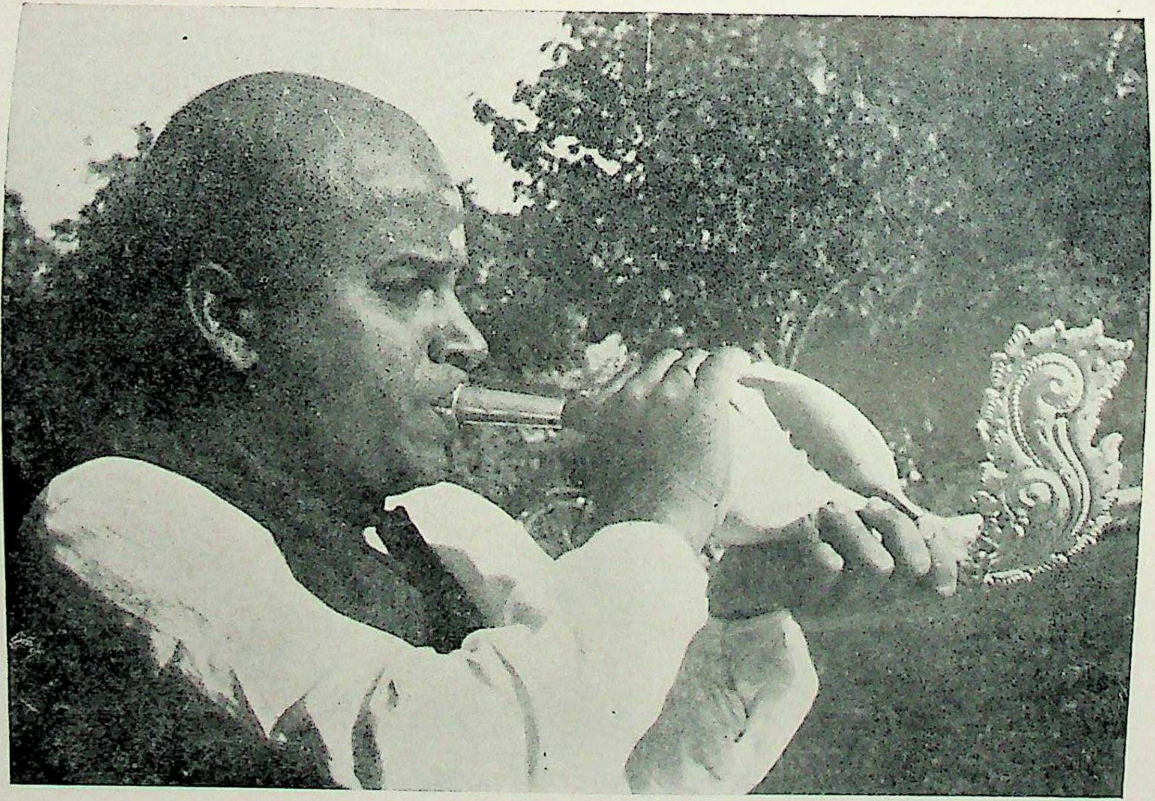

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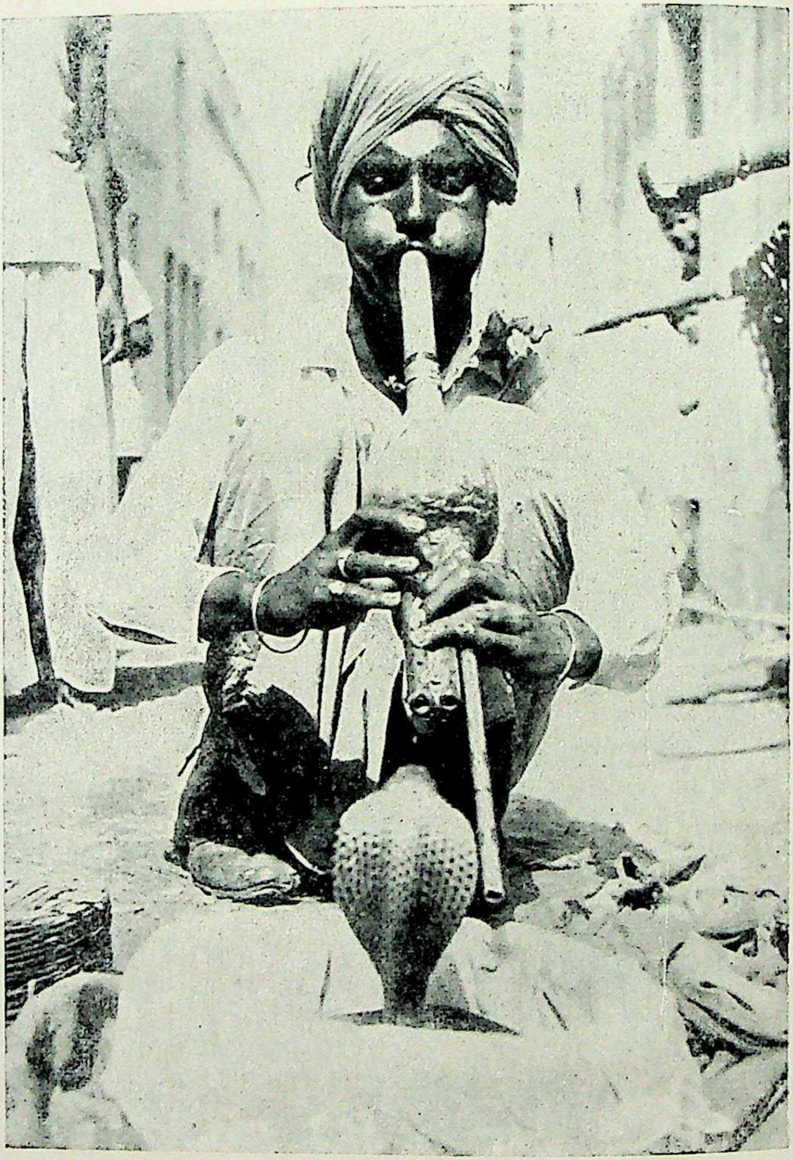

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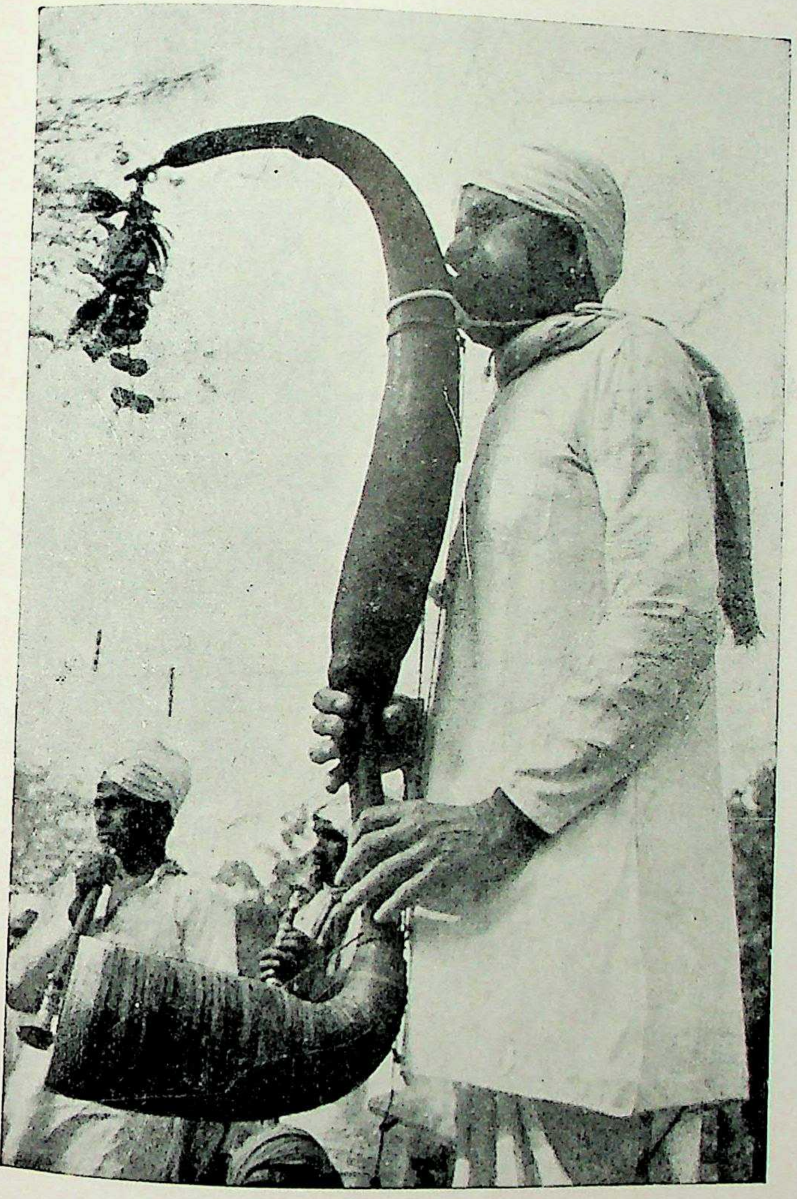

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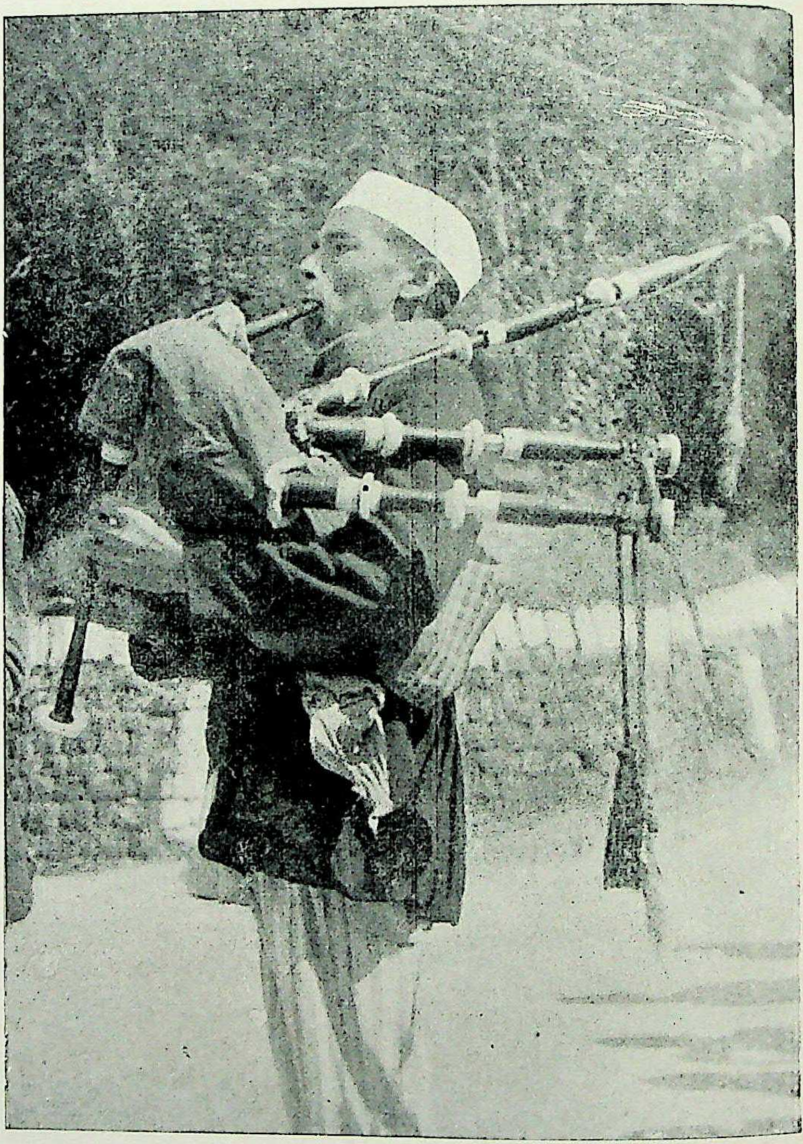

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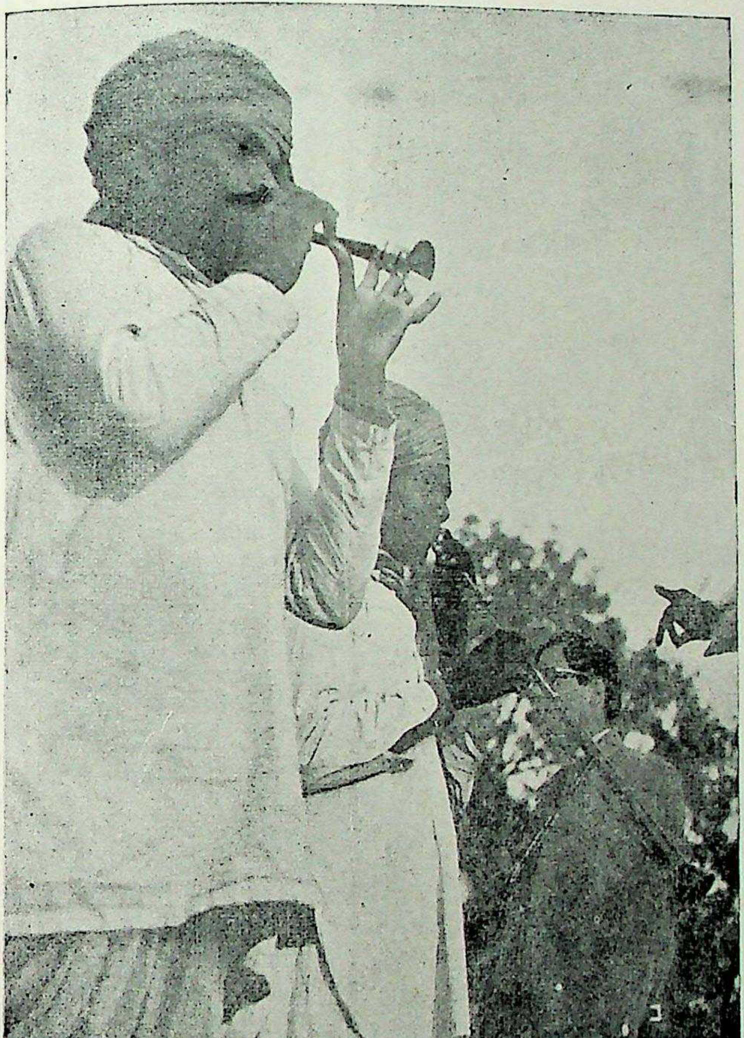
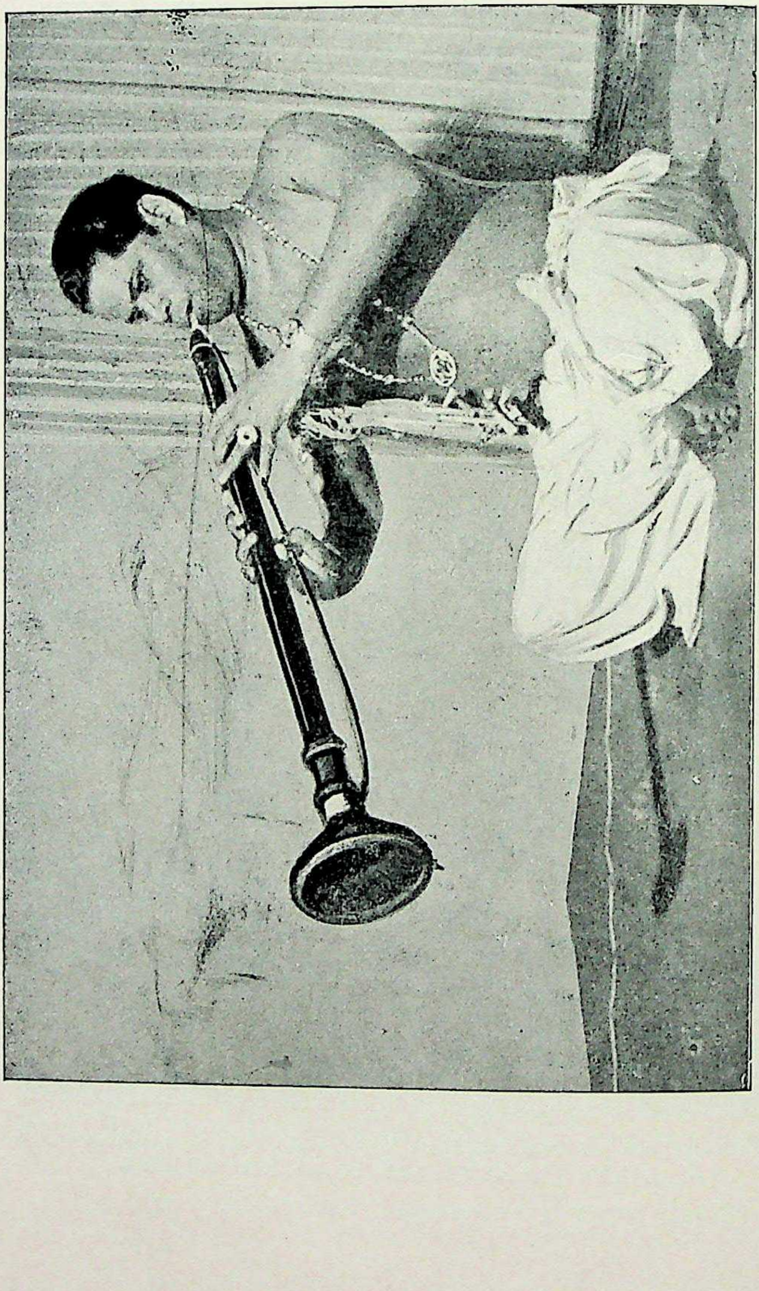


Fig. 7.20. The *shehnai* and the *sur*. Maharashtra.



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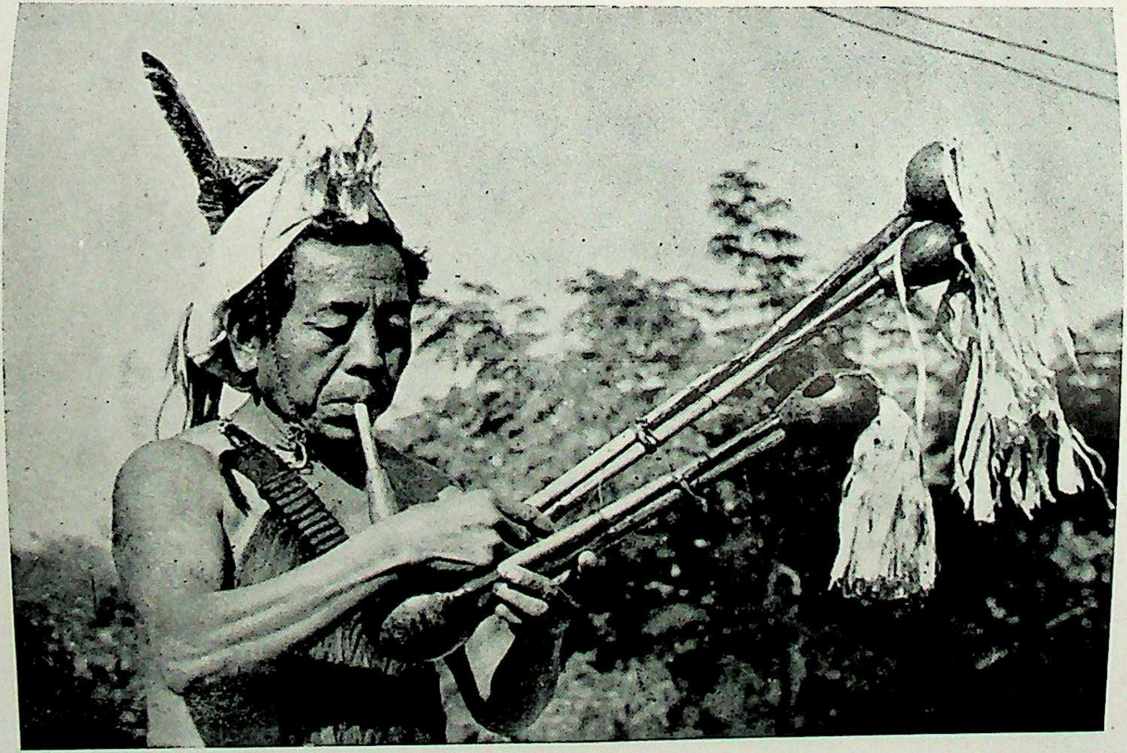

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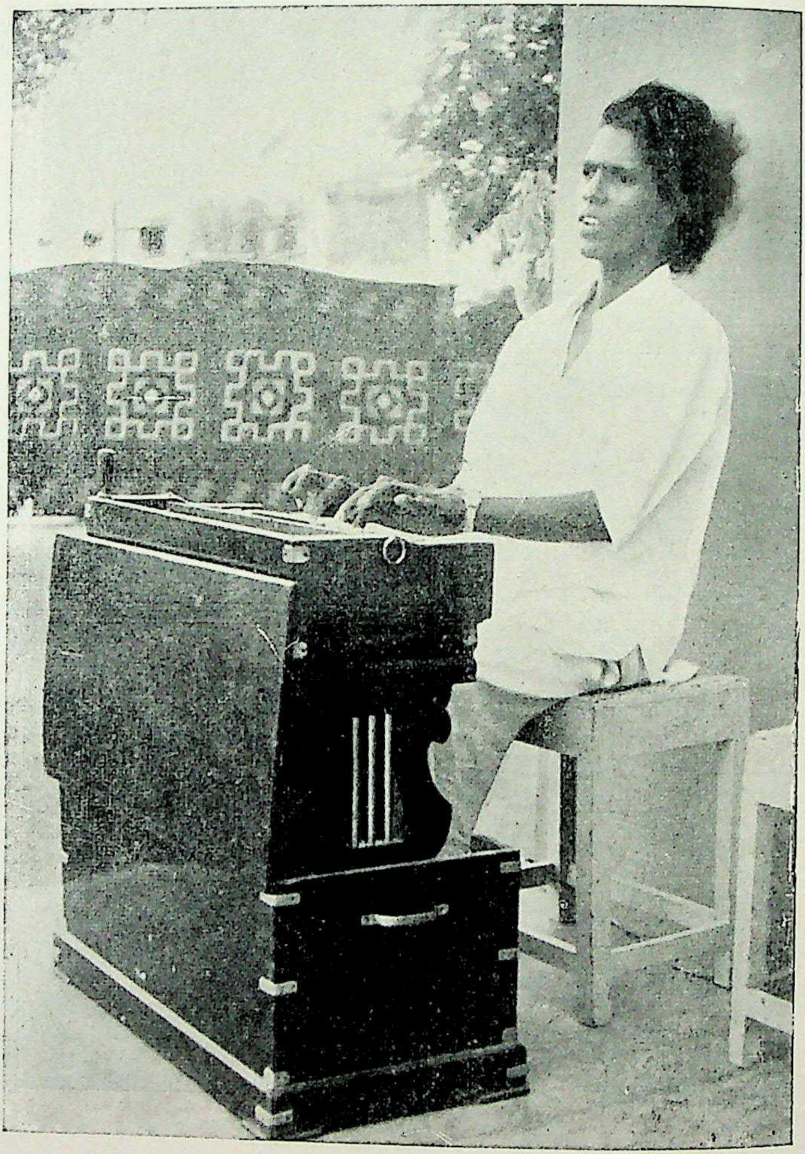

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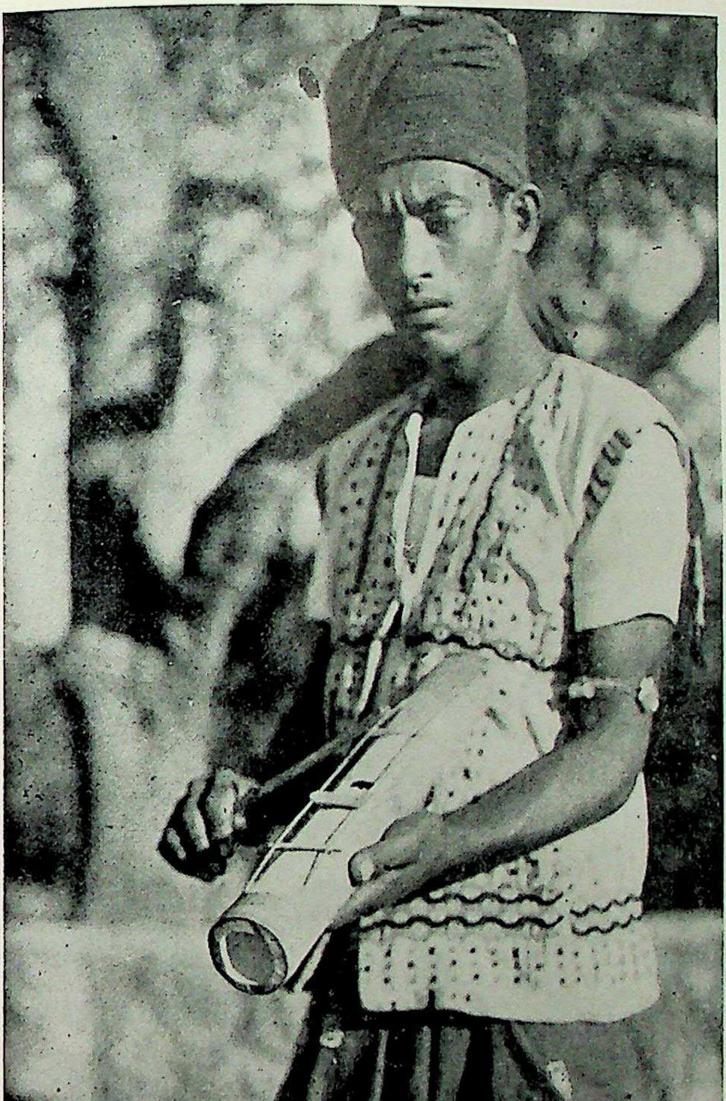
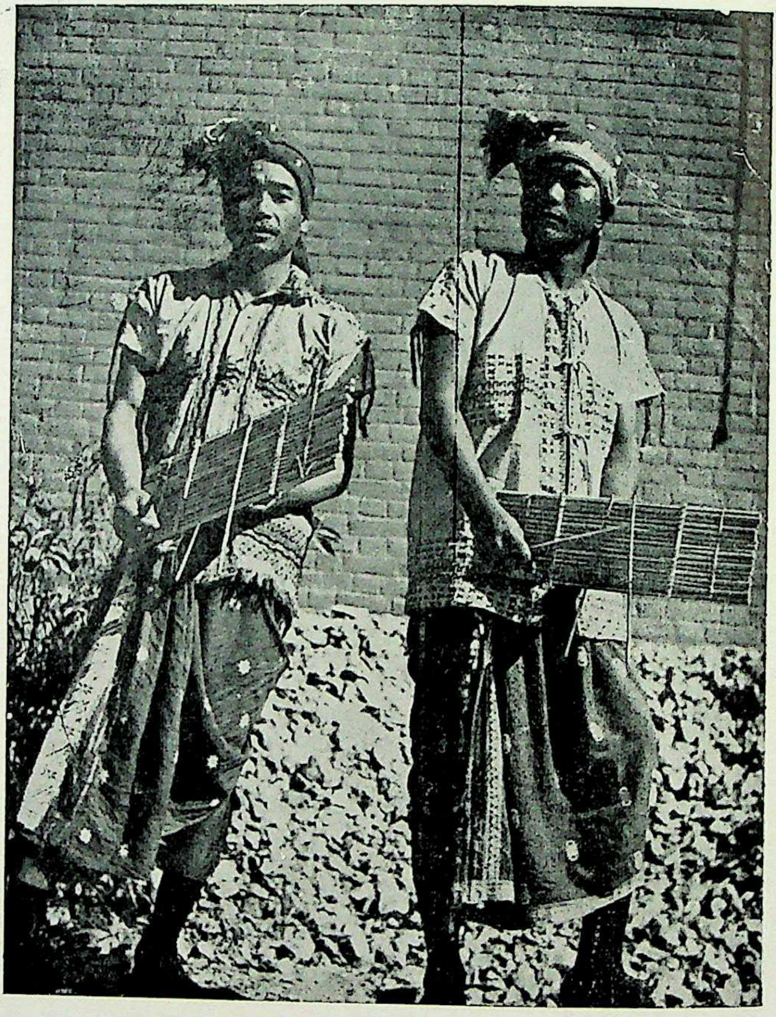


Fig. 8.1. The *gintang*. Assam.



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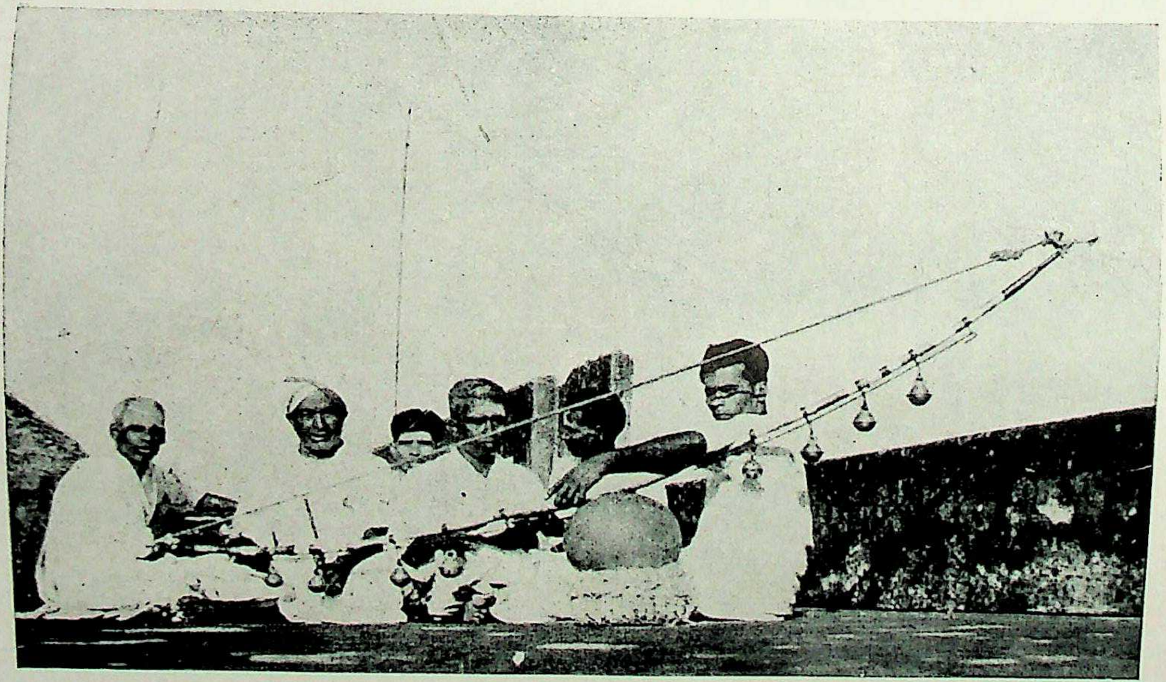
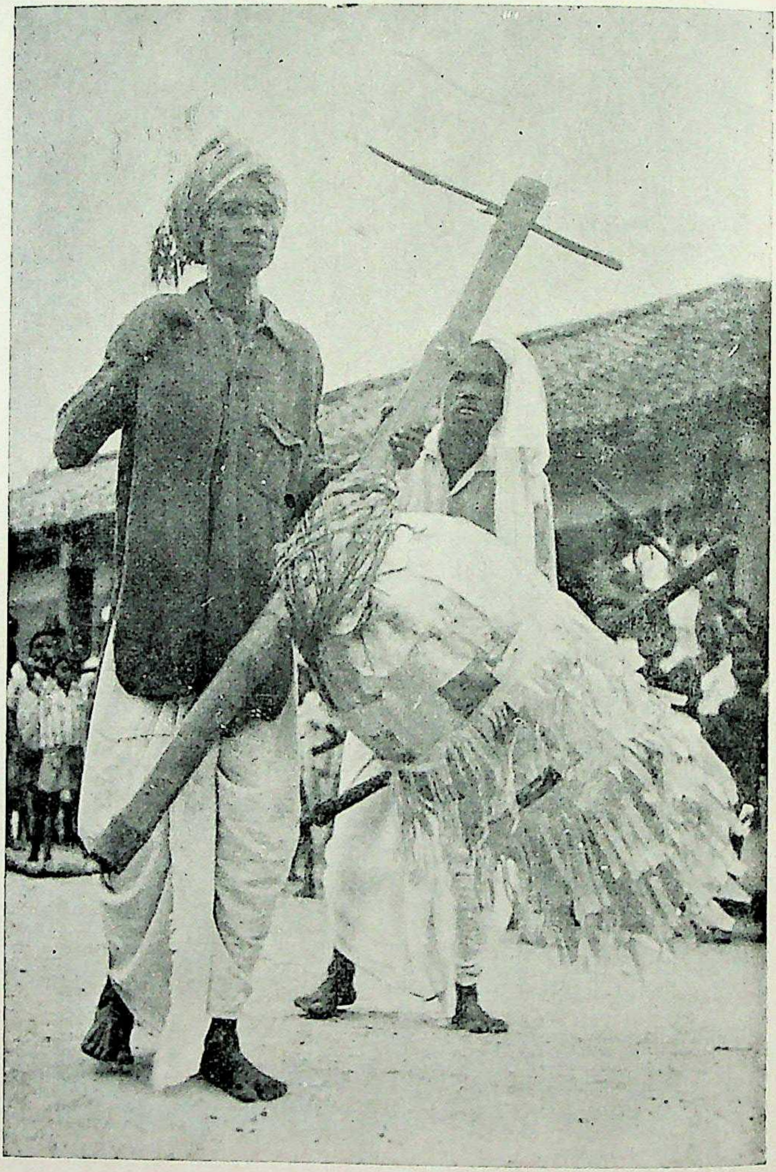


Fig. 8.3. The *villadi vadyam.* Tamil Nadu.



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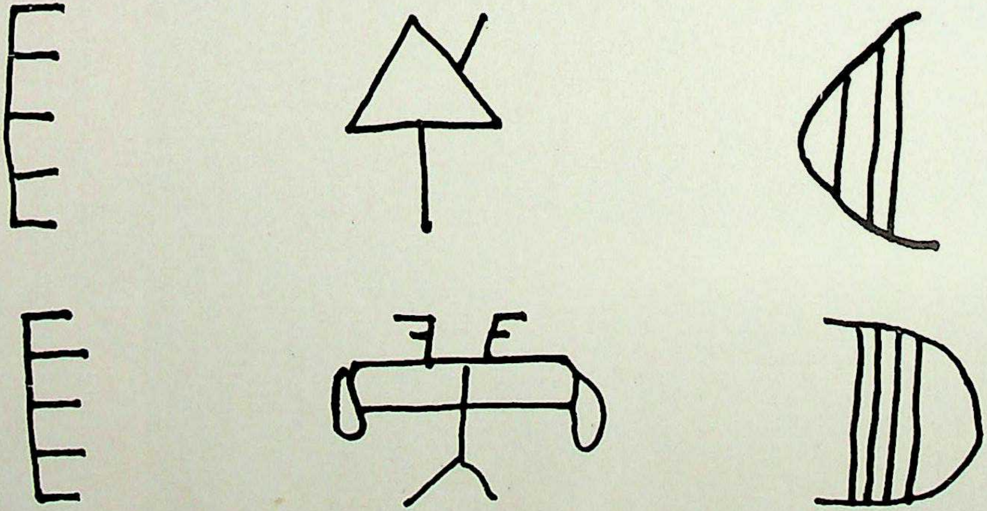

Fig. 8.5. Bow-shaped harps. Based on Indus valley inscriptions.

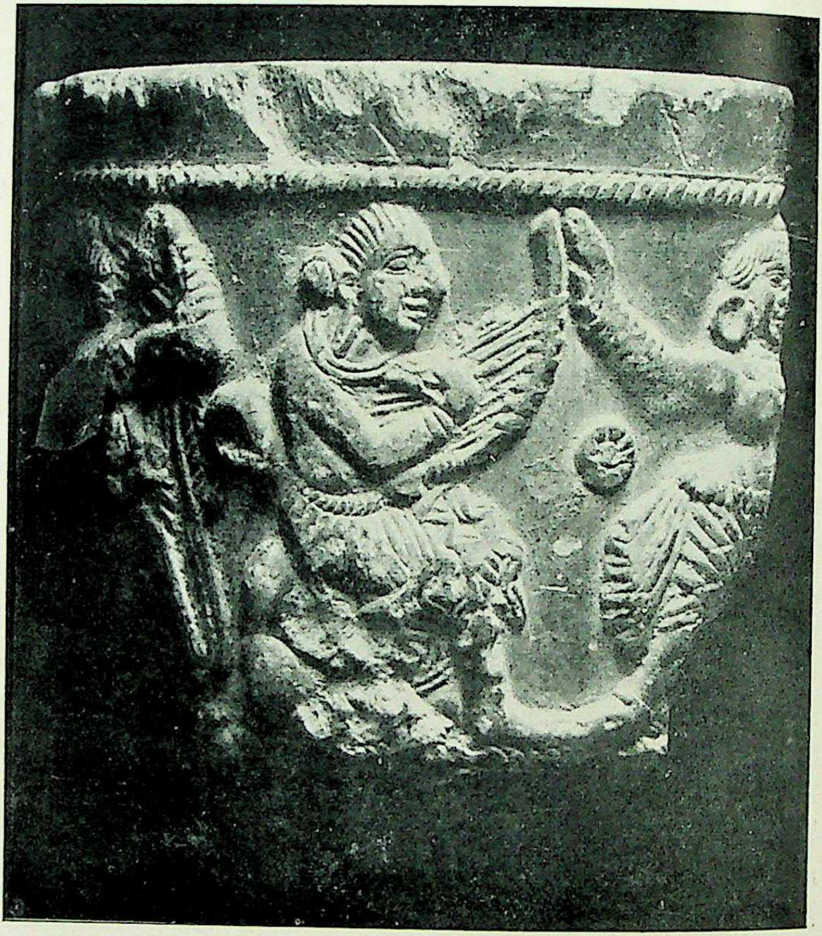

Fig. 8.6. The *sapta-tantri veena*. The *kona* (plecturm) can be seen in the right arm of the player. Kausambi. Gupta period.

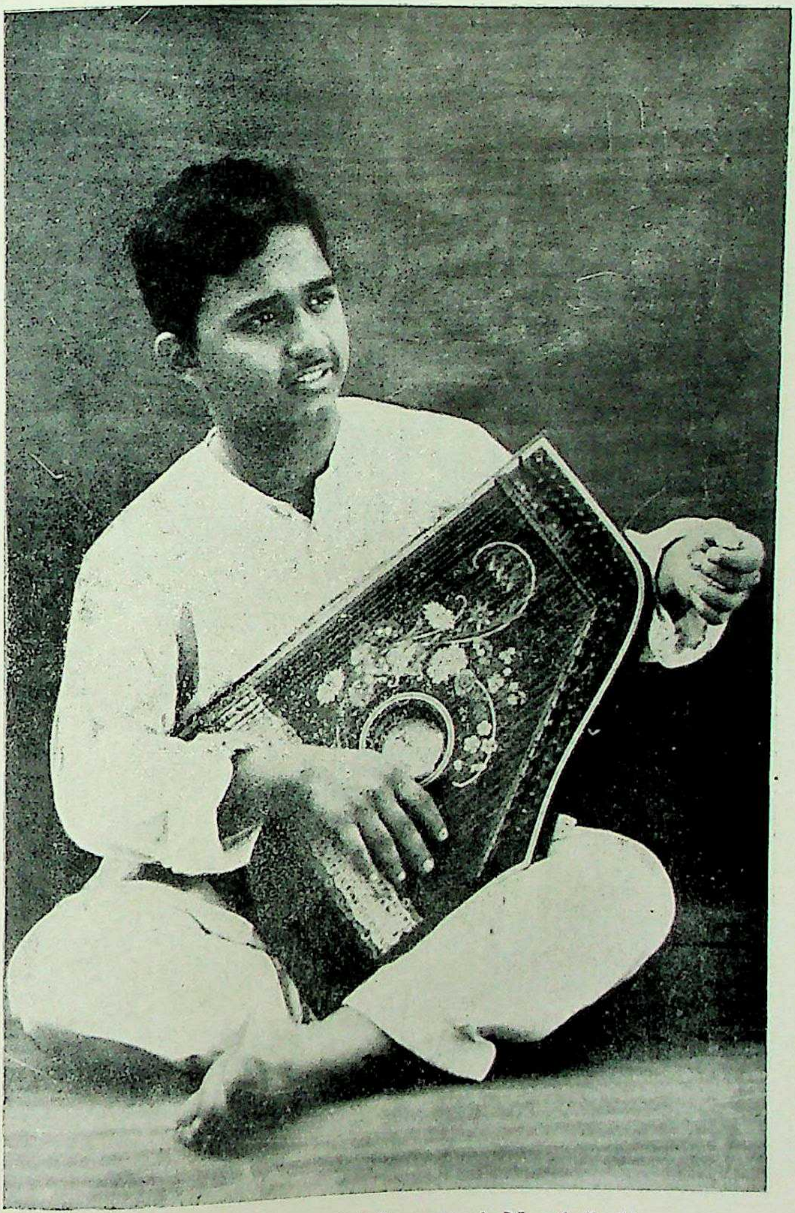

Fig. 8.7. The *svaramandal*. Imported. North India.

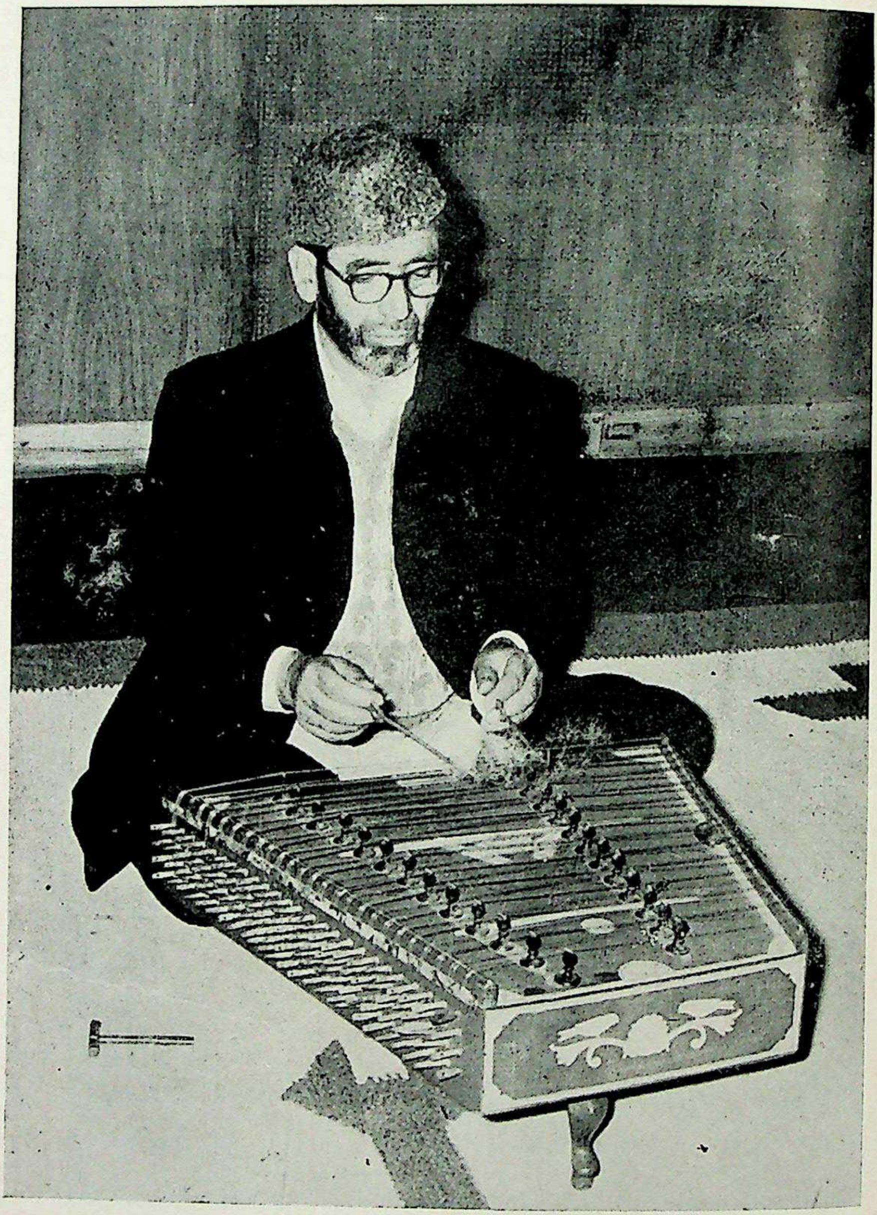

Fig. 8.8. The *santur*. Kashmir.

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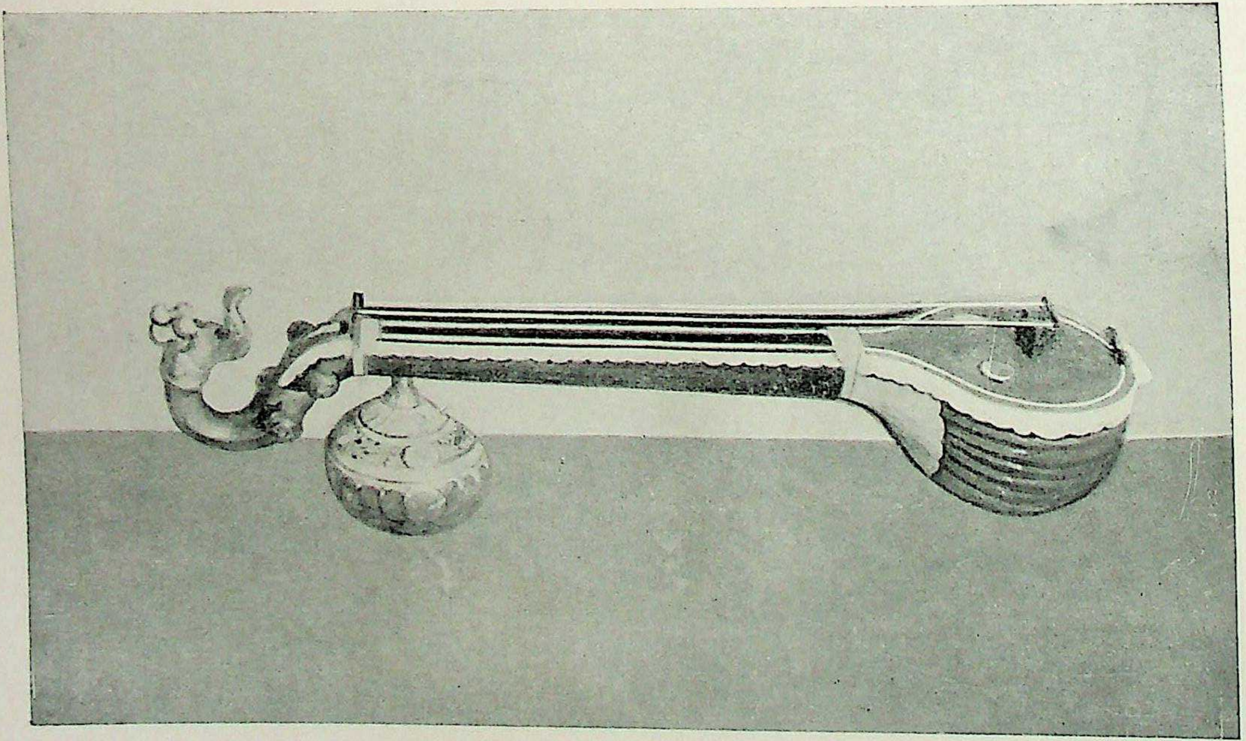


Fig. 8.9. The *gettu vadyam*. Tamil Nadu.

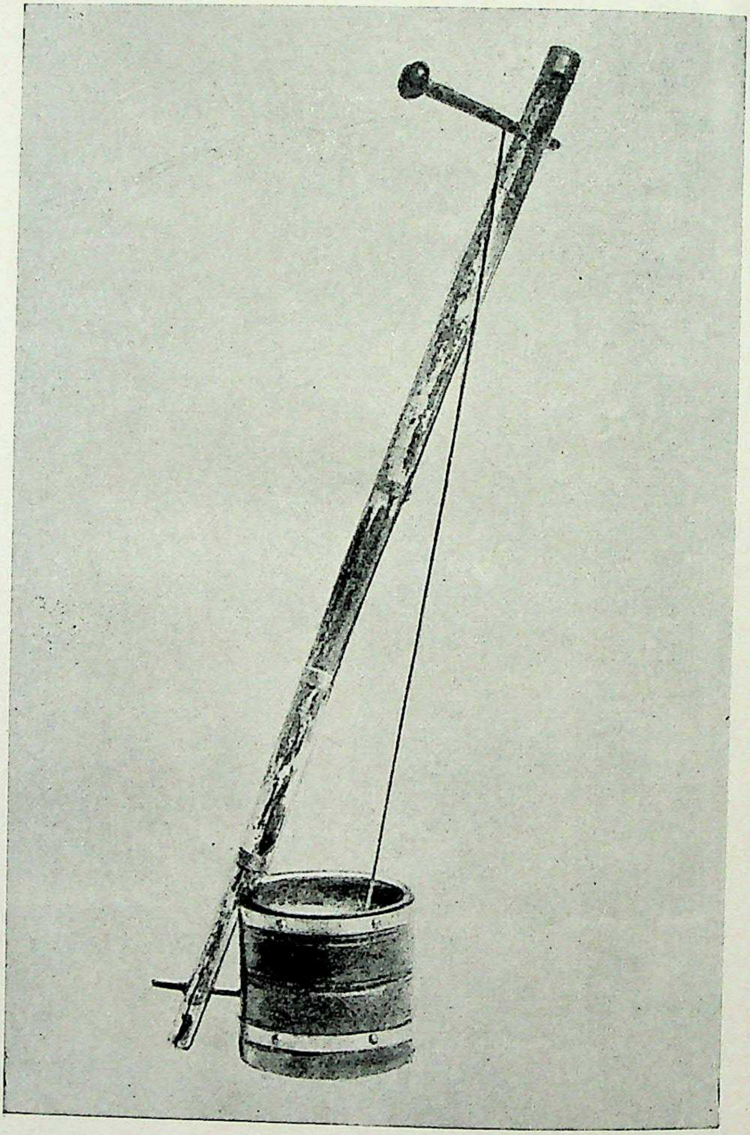
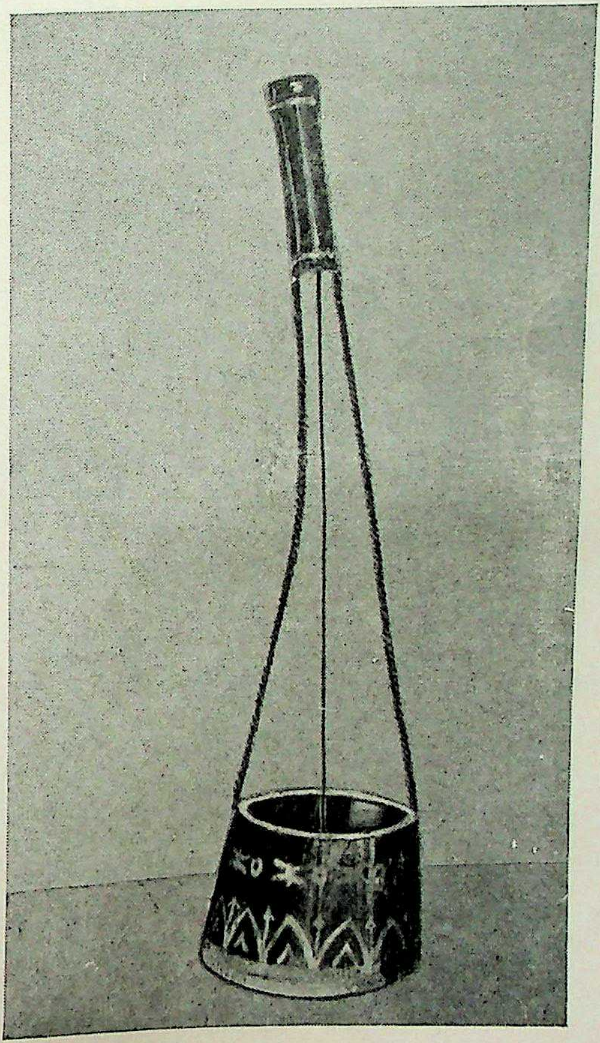


Fig. 8.10. The *tun tune*. Maharashtra.



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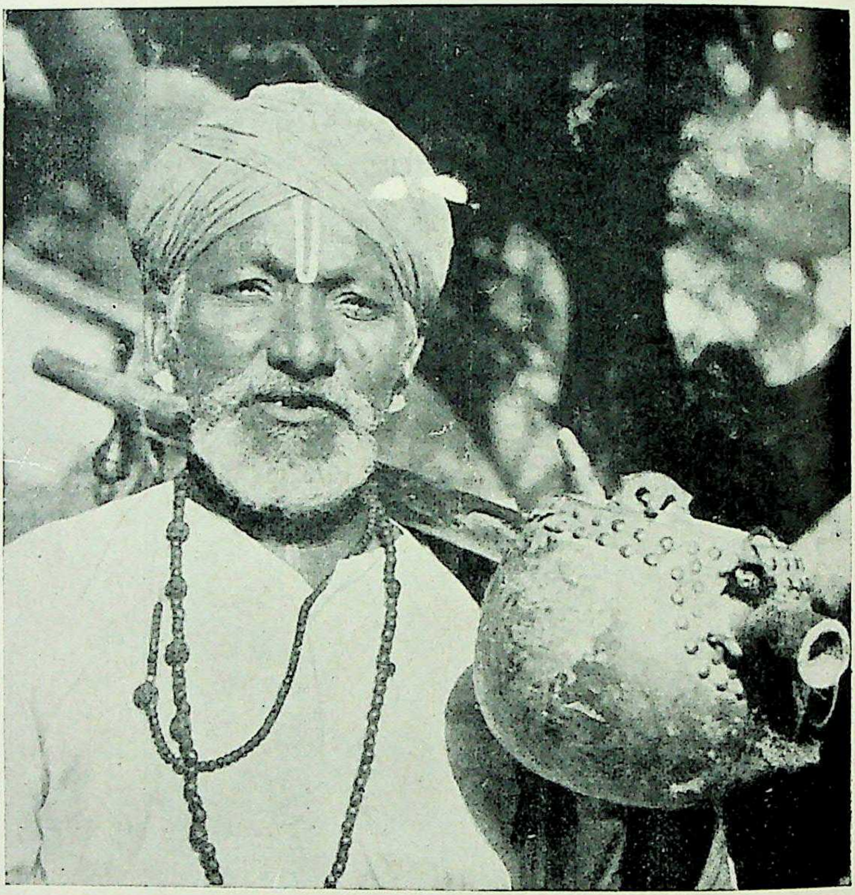
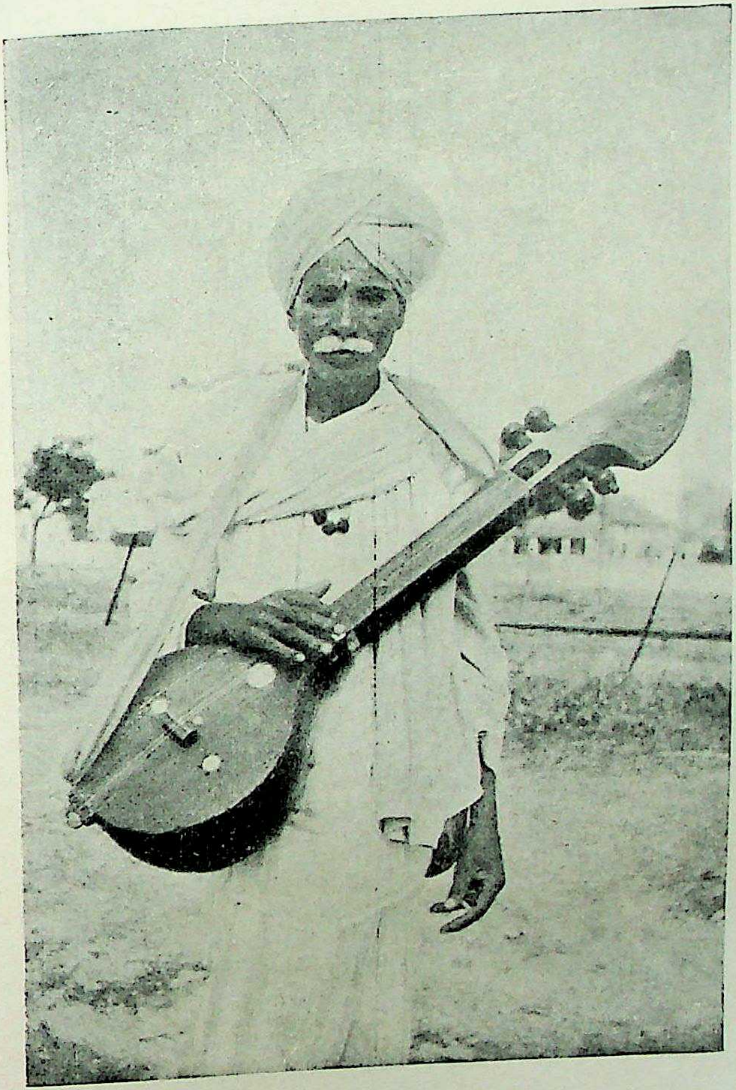


Fig. 8.12. The *ek-tar*. North India.



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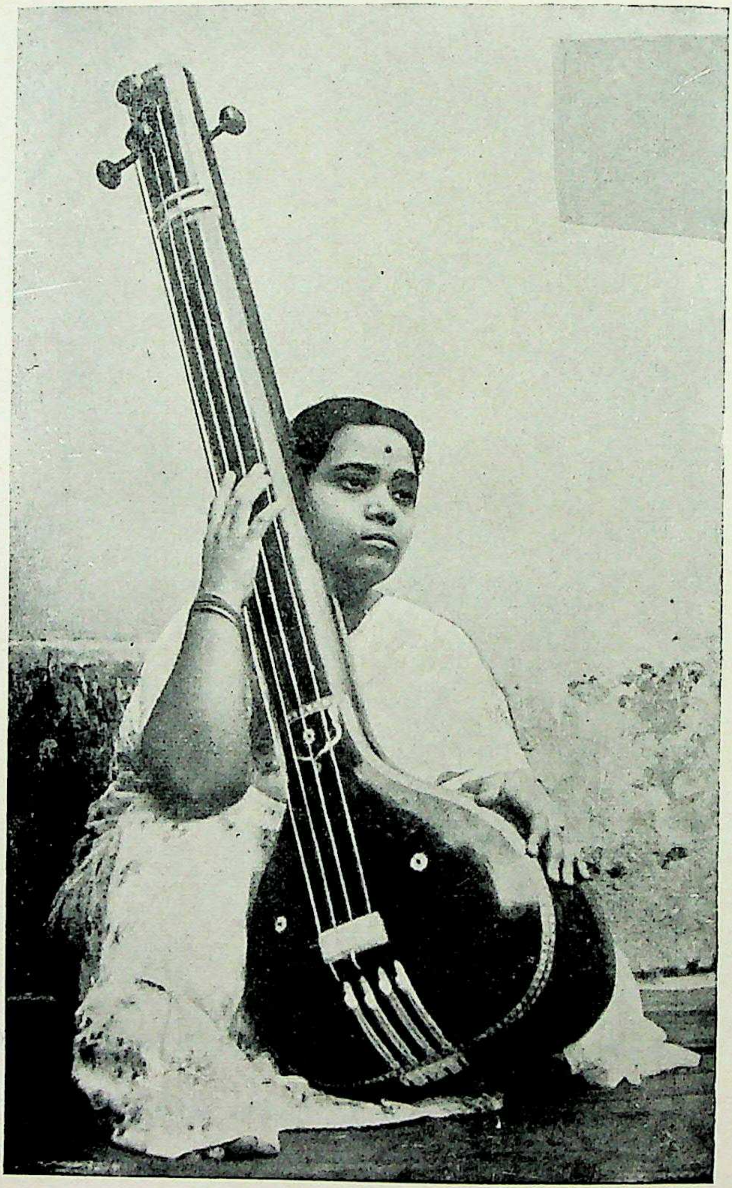


Fig. 8.14. The *tanpura*. North India.

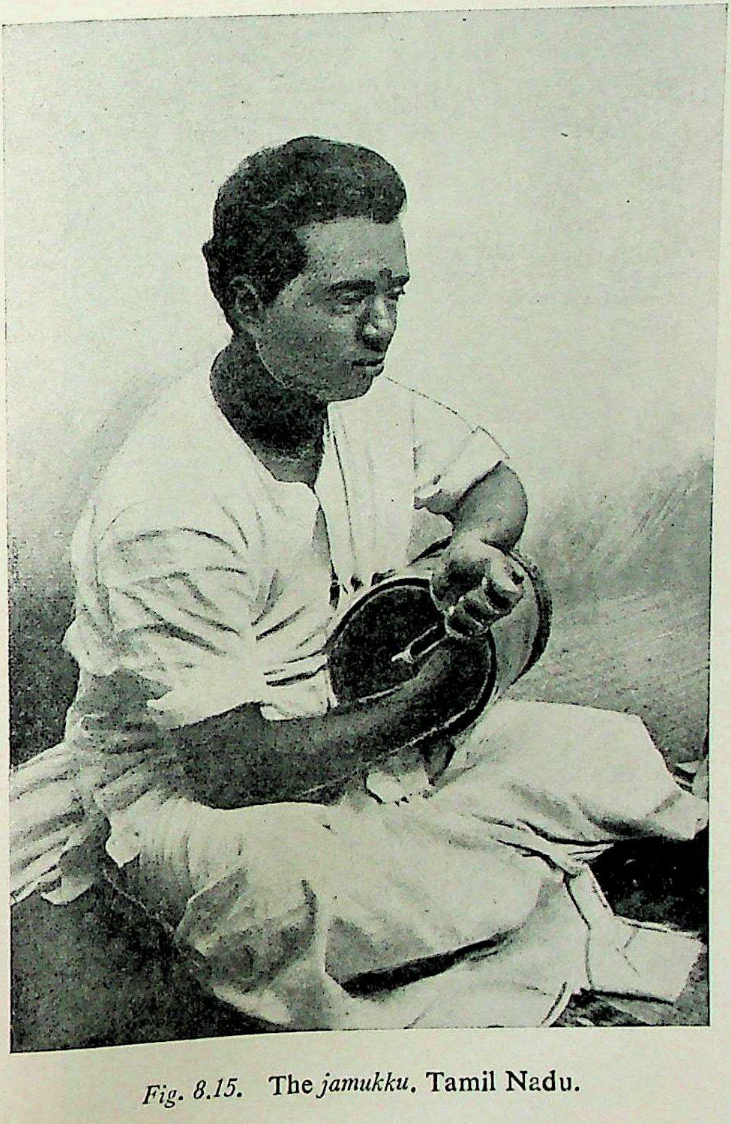
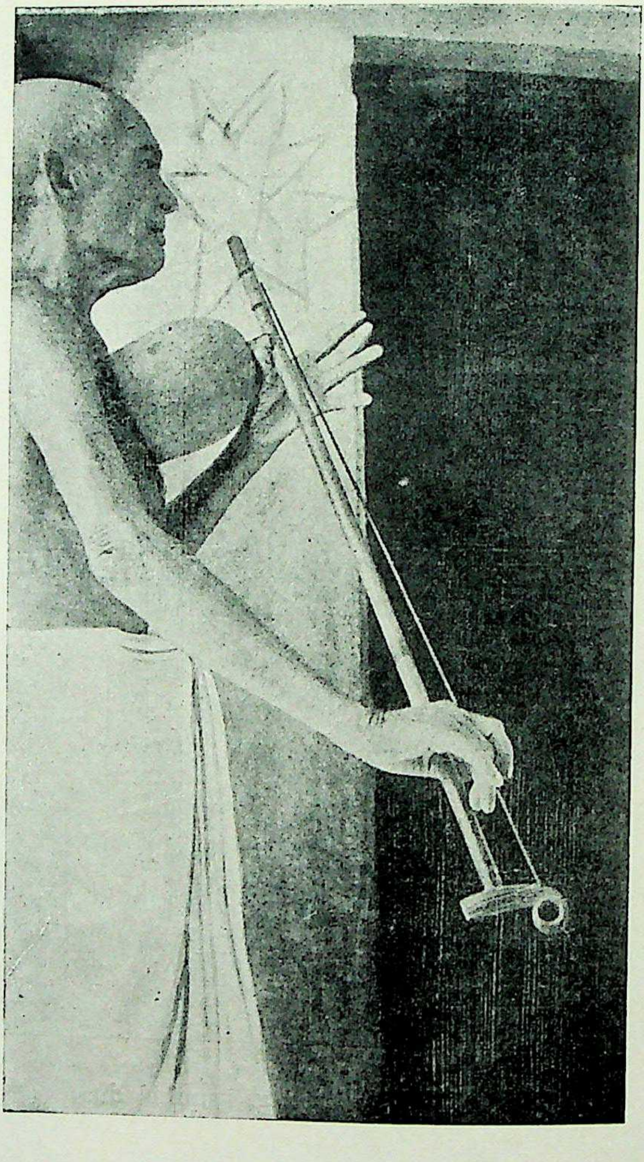


Fig. 8.15. The *jamukku*. Tamil Nadu.



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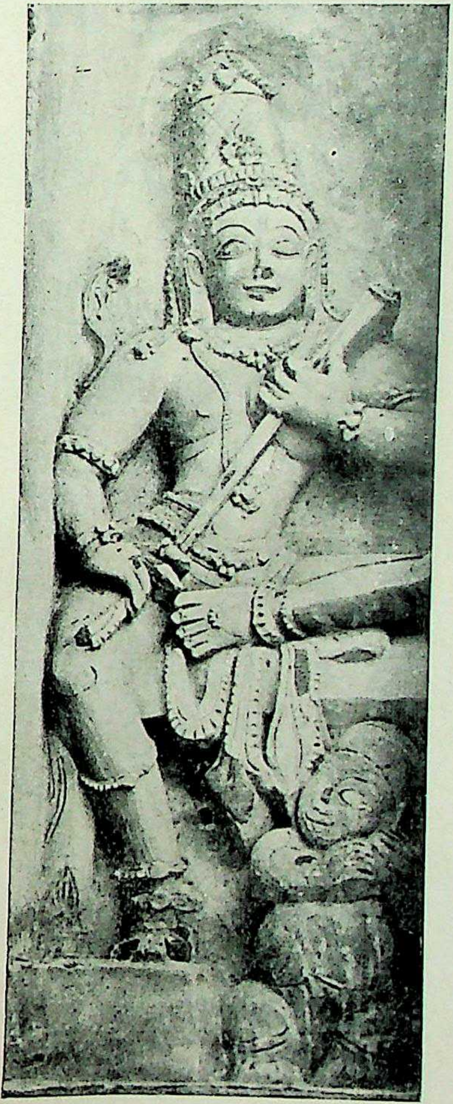


Fig. 8.17. The *alapini* (?). Kanchipuram. 8th-9th Cent. A.D. While the *ekatantri* and the *alapini* were both single stringed, the former was stopped with a *kamrika* and latter with the fingers of the left hand as here.

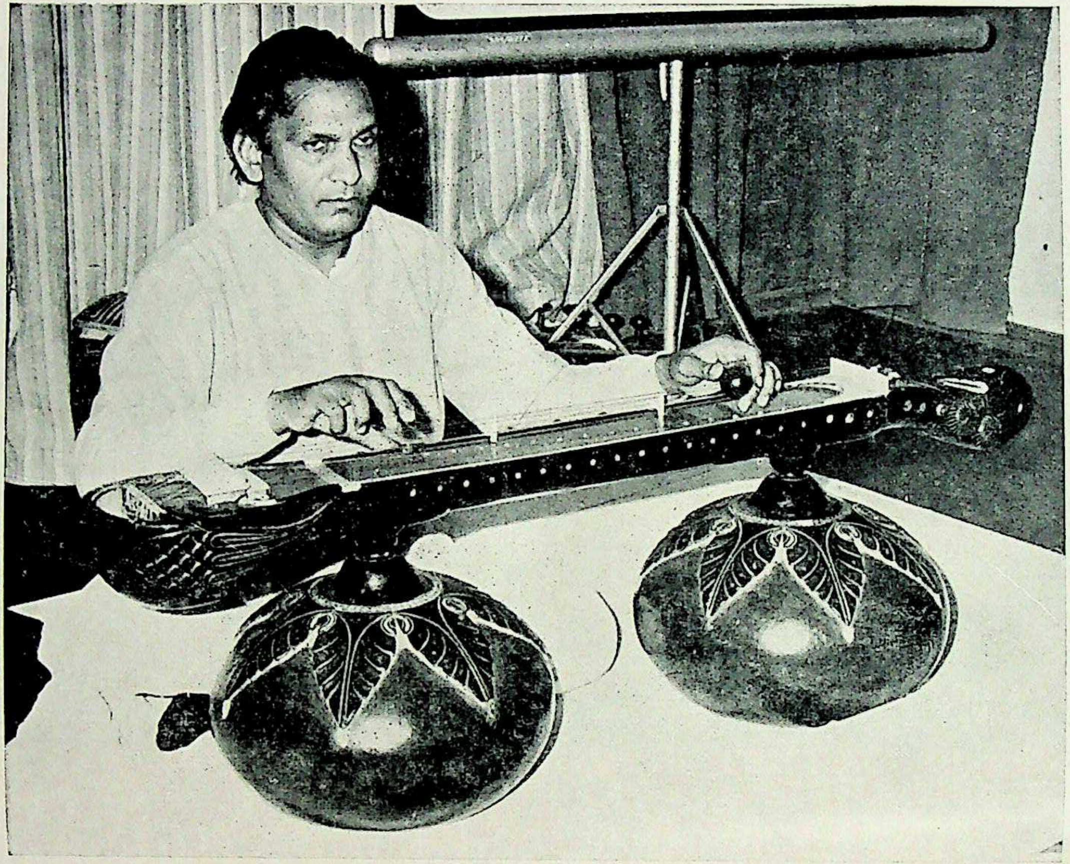


Fig. 8.18. The *vichitra veena*. North India.

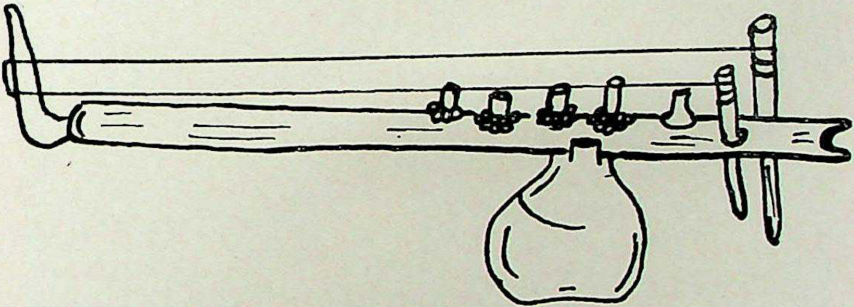


Fig. 8.19. The *kullutan rajan* of the Savaras.

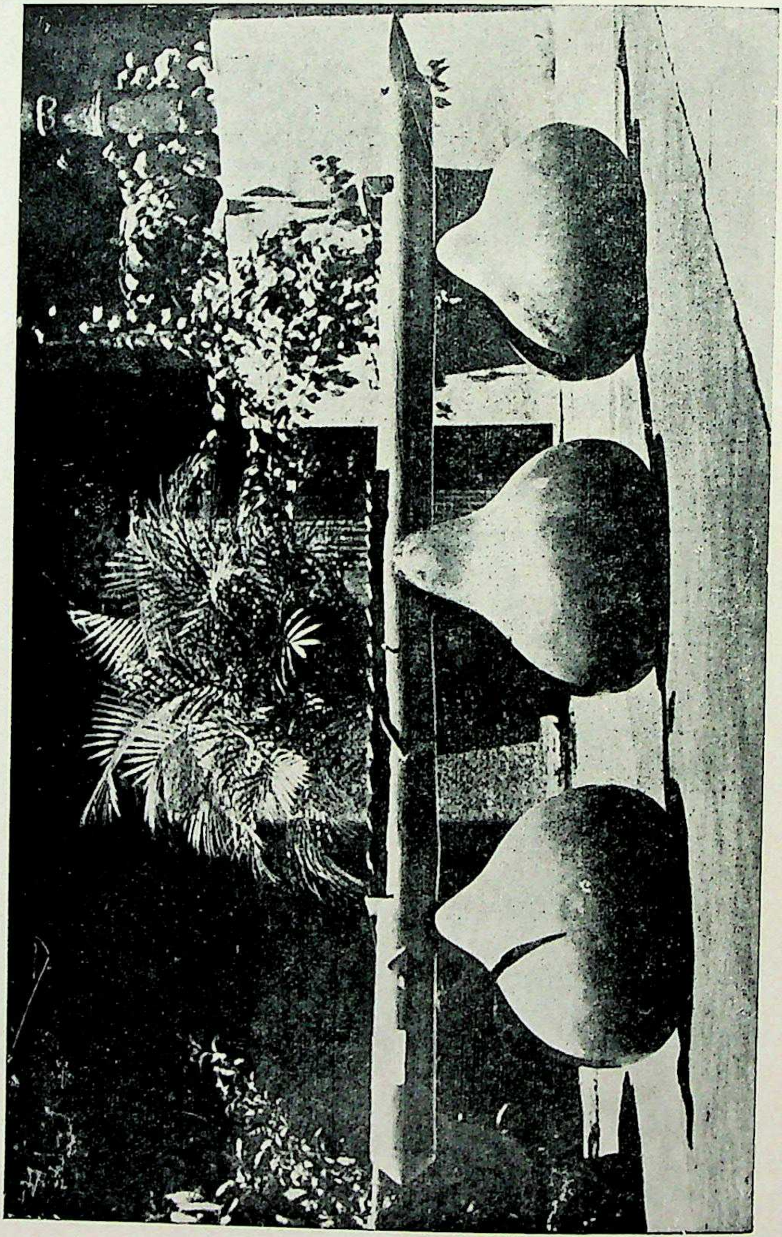


Fig. 8.20. The *kinnari*. Karnataka.

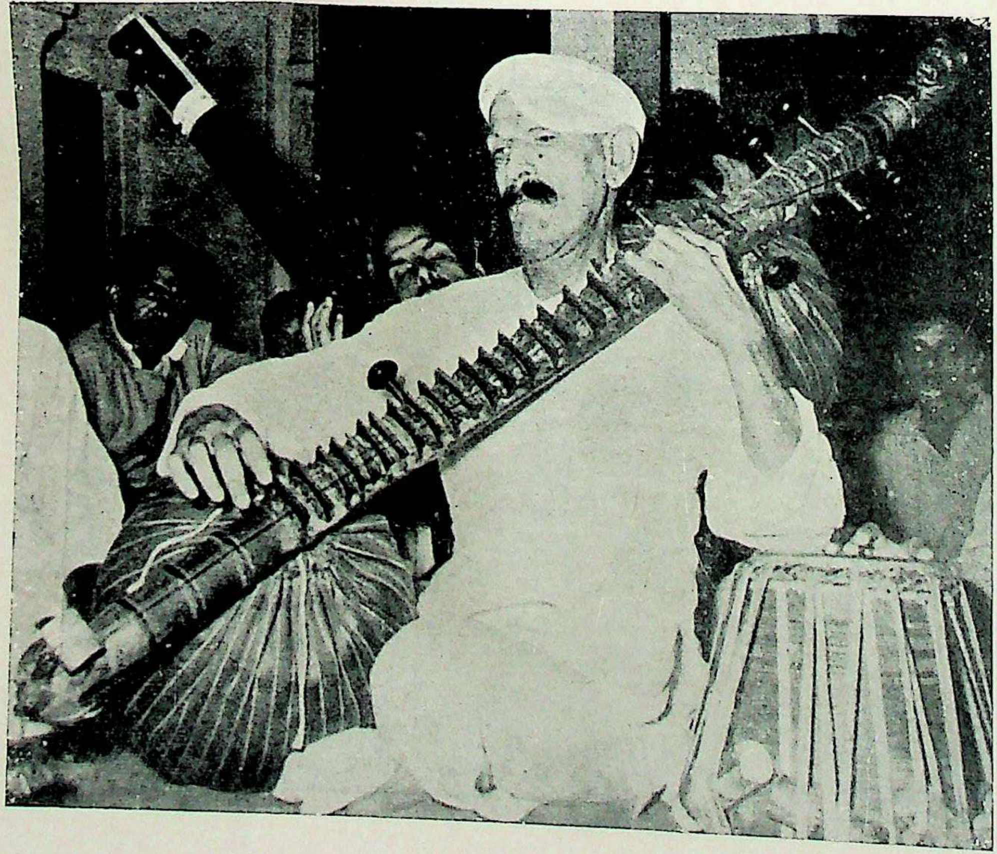


Fig. 8.21. The *Rudra veena*. North India.

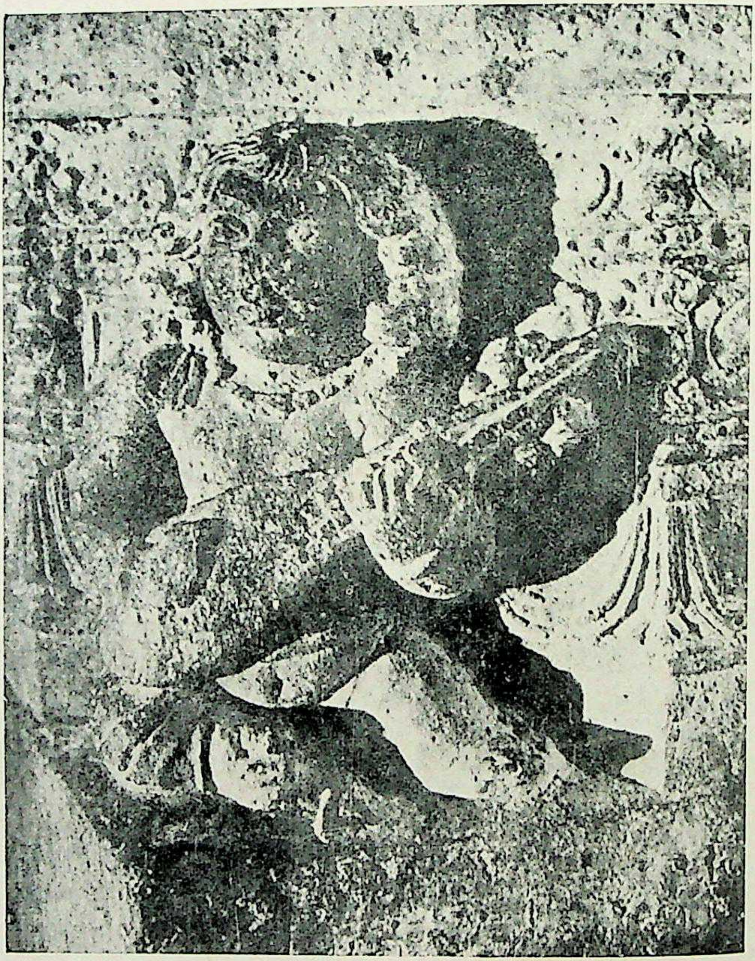


Fig. 8.22. The *kacchapi* (?). Ajanta. Note the primitive frets.

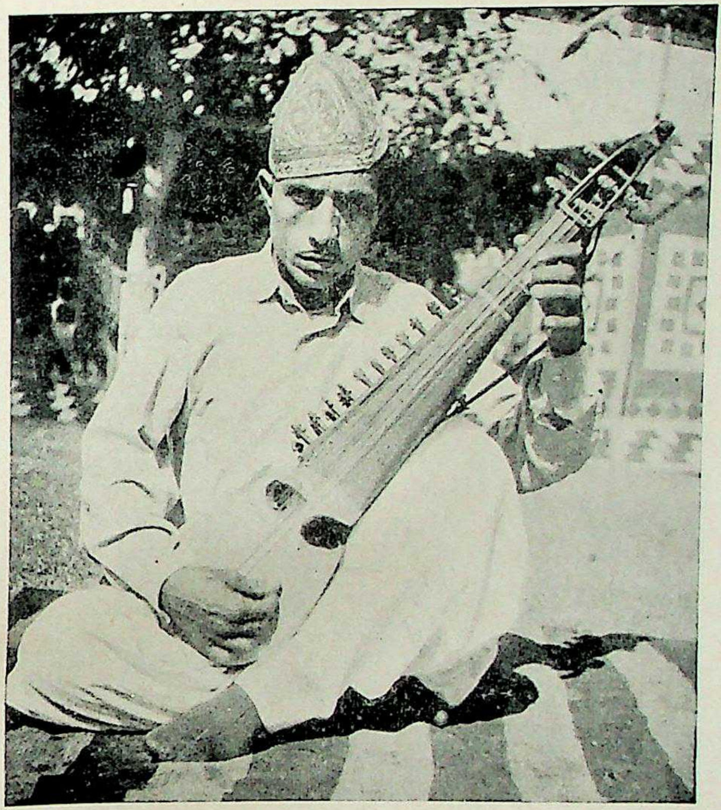


Fig. 8.23. The *rabab* Kashmir. Note the four movable gut frets.

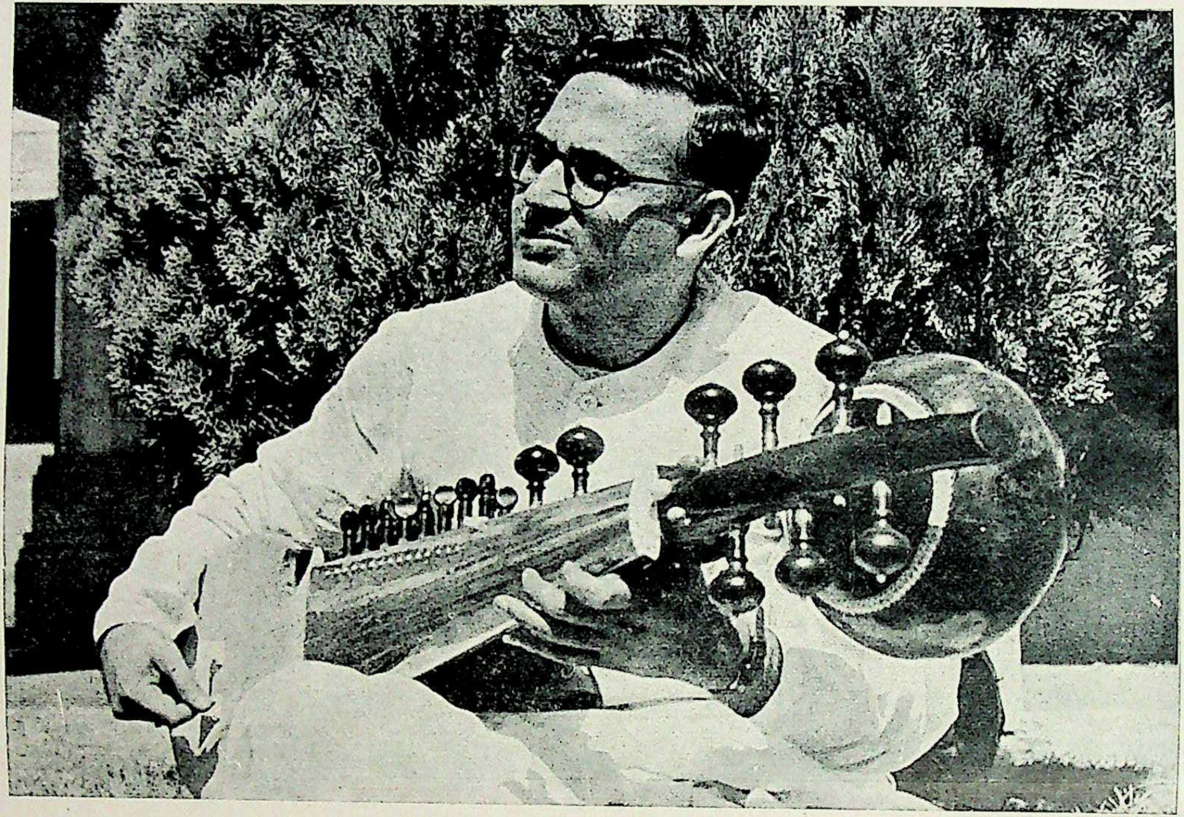


Fig. 8.24. The *sarod*. North India.

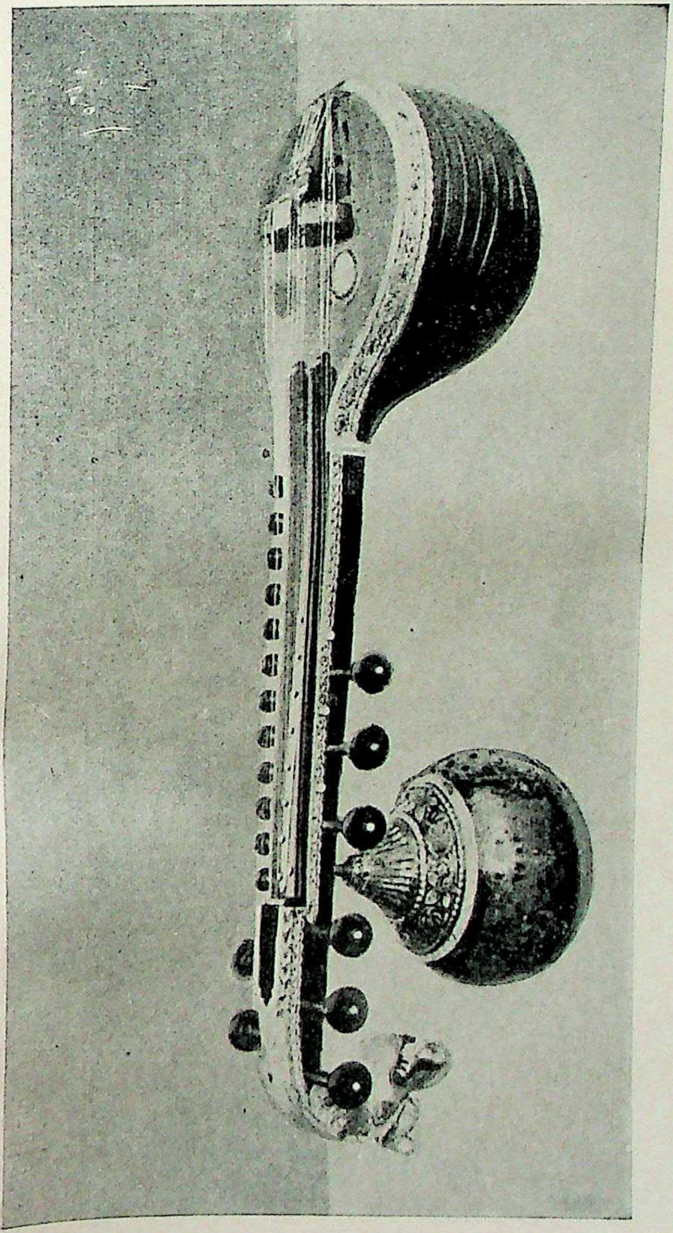


Fig. 8.25. The *gottu vadyam*. South India.

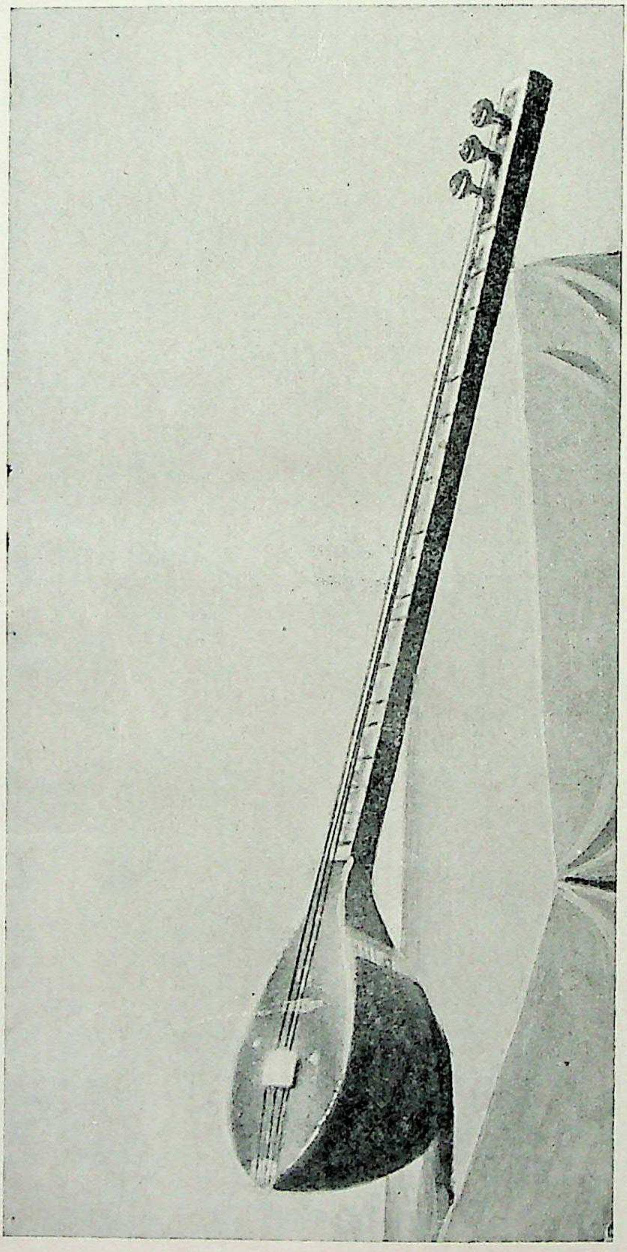
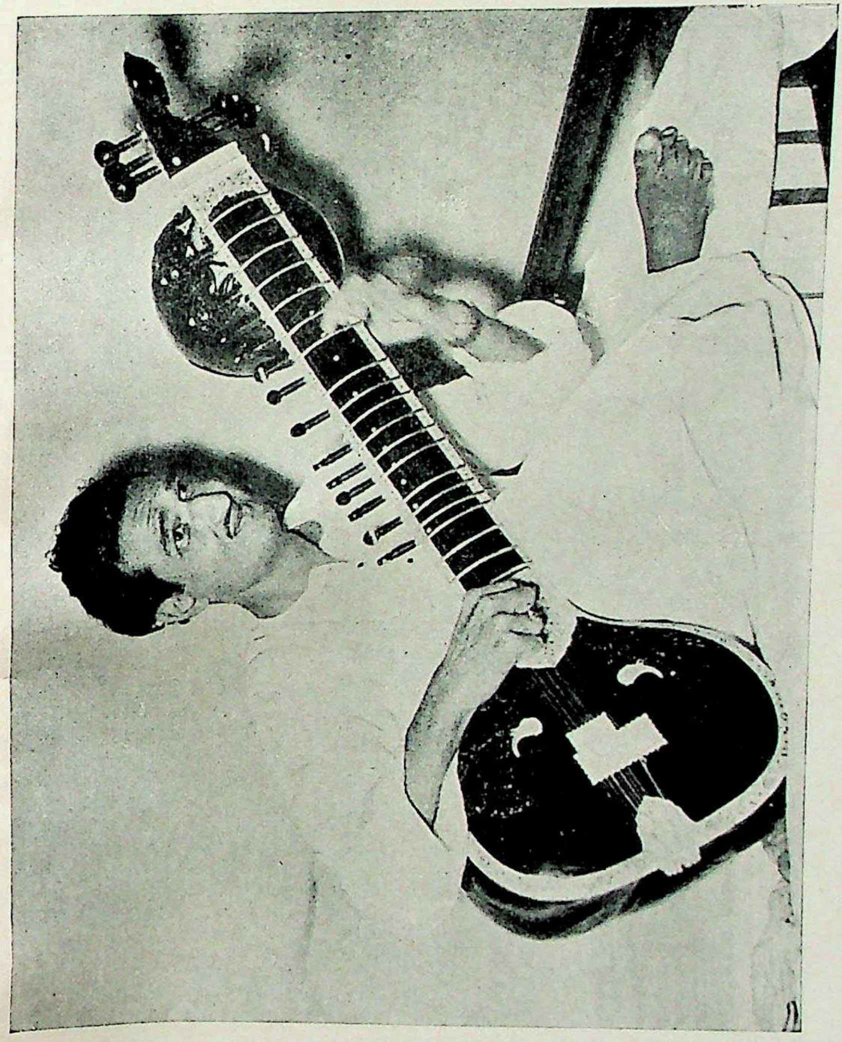


Fig. 8.26. The *saitar*. Kashmir. Note again the movable gut frets, as in the *rabab* and the *sitar*.



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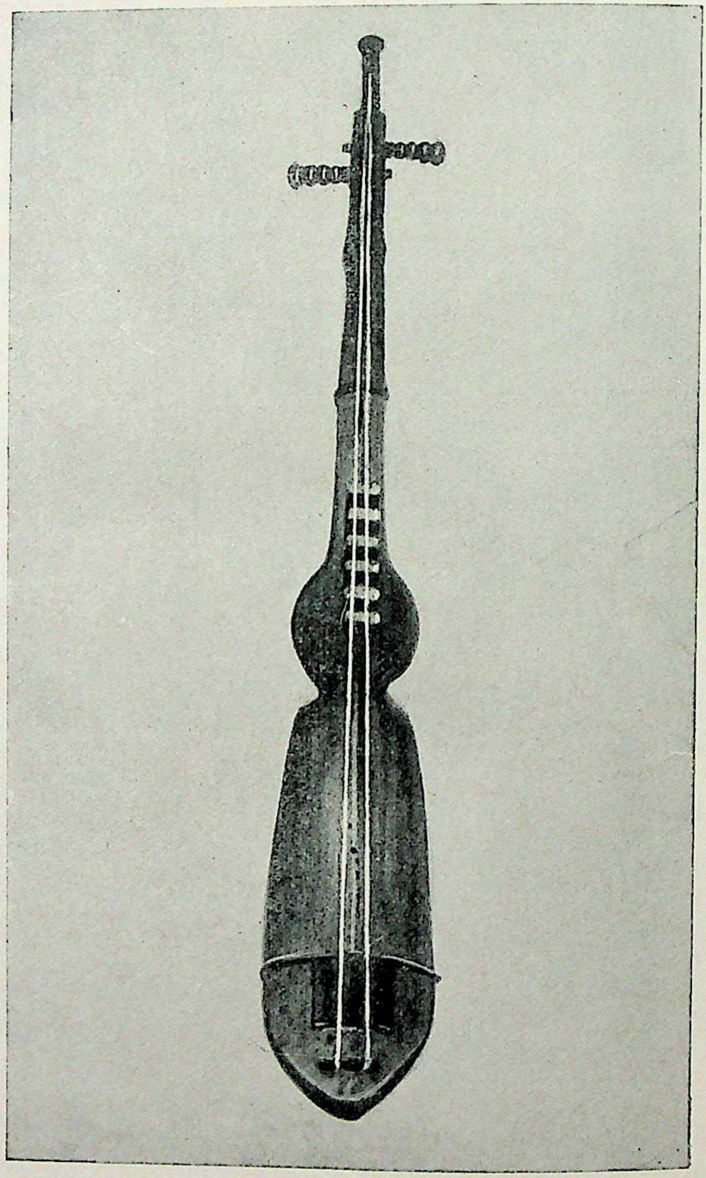

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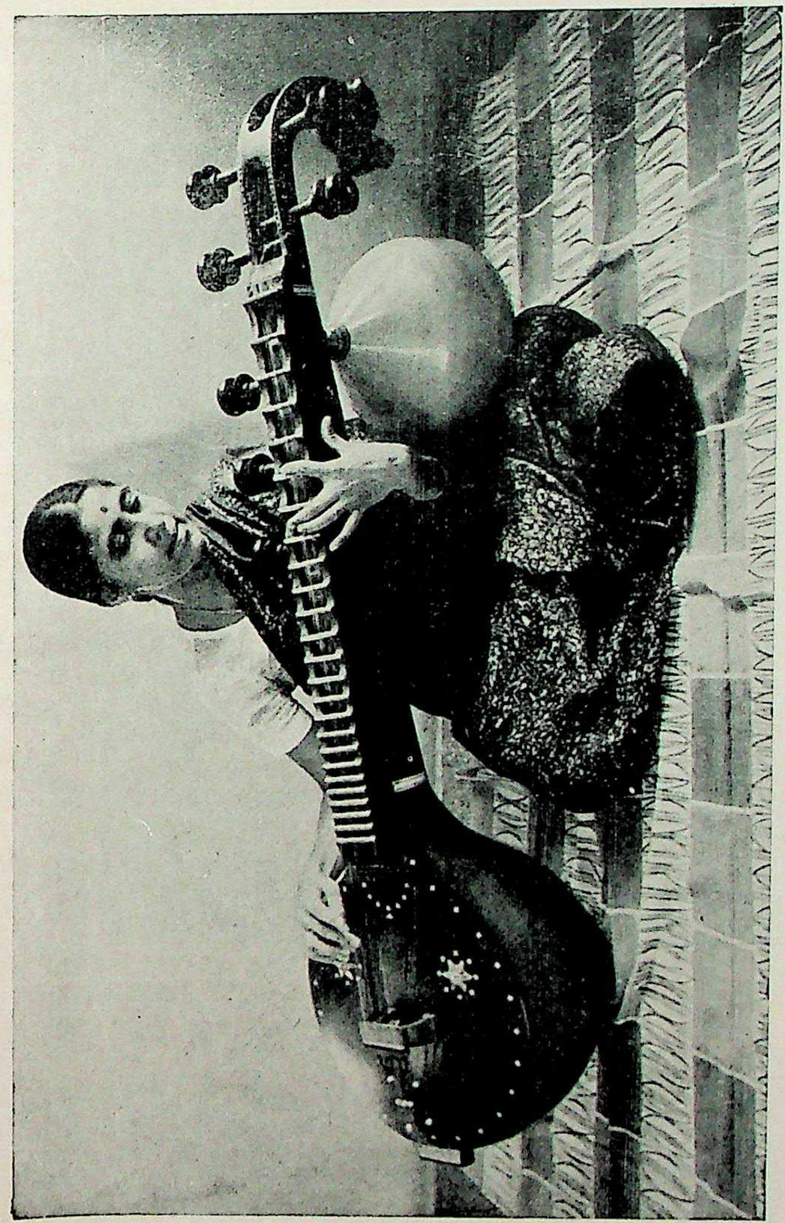

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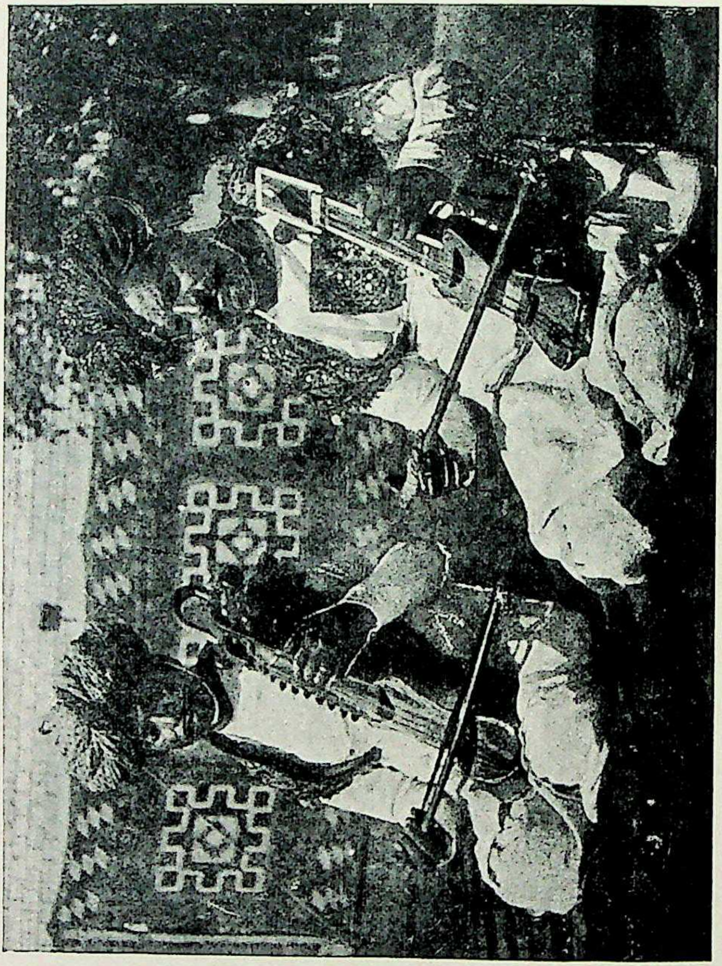
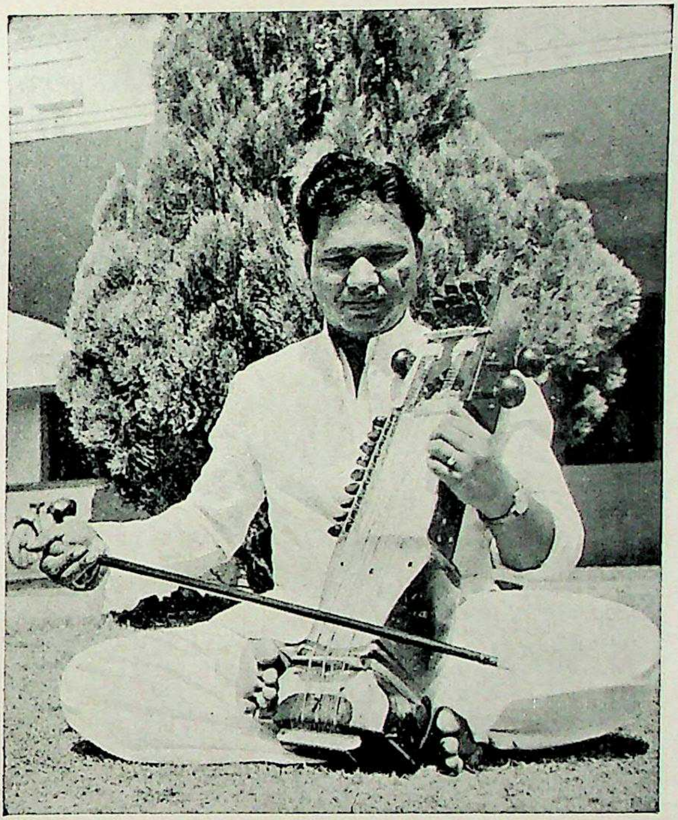


Fig. 8.30. The *Sindhi sarangi* and the *Gujeratan sarangi*. Both are folk instruments. Rajasthan.



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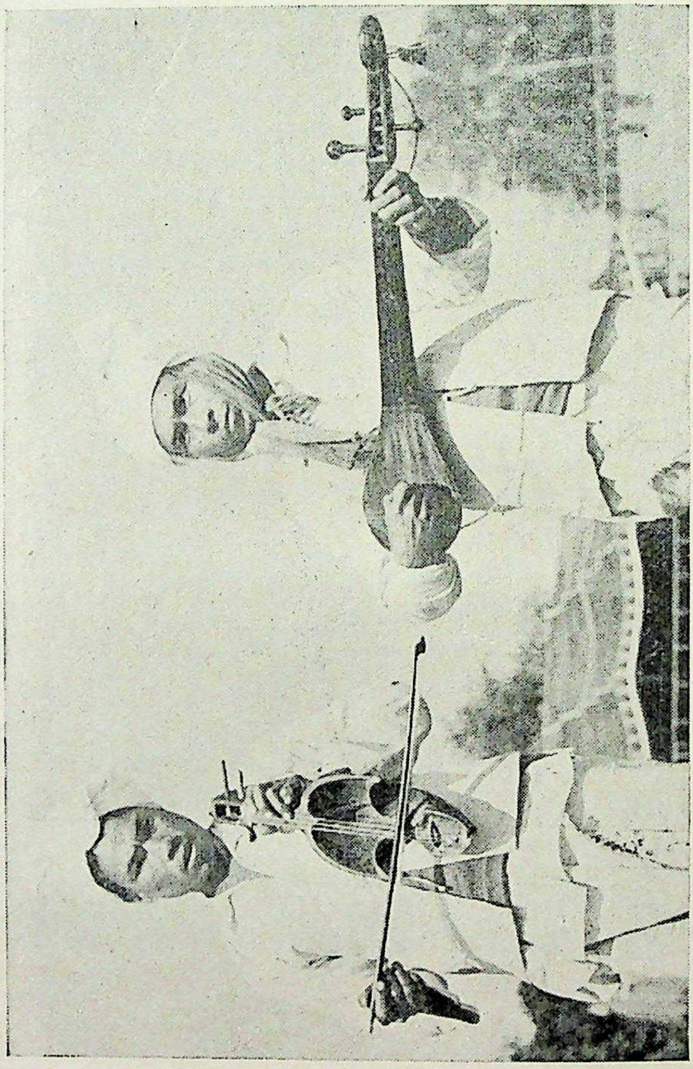

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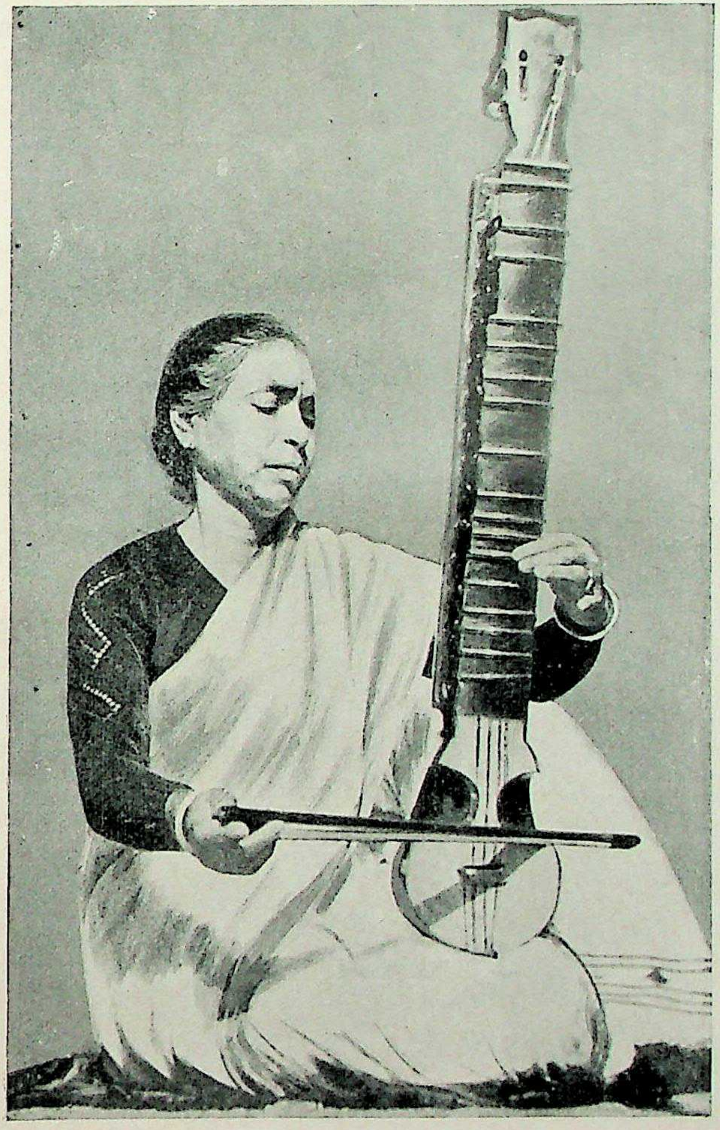

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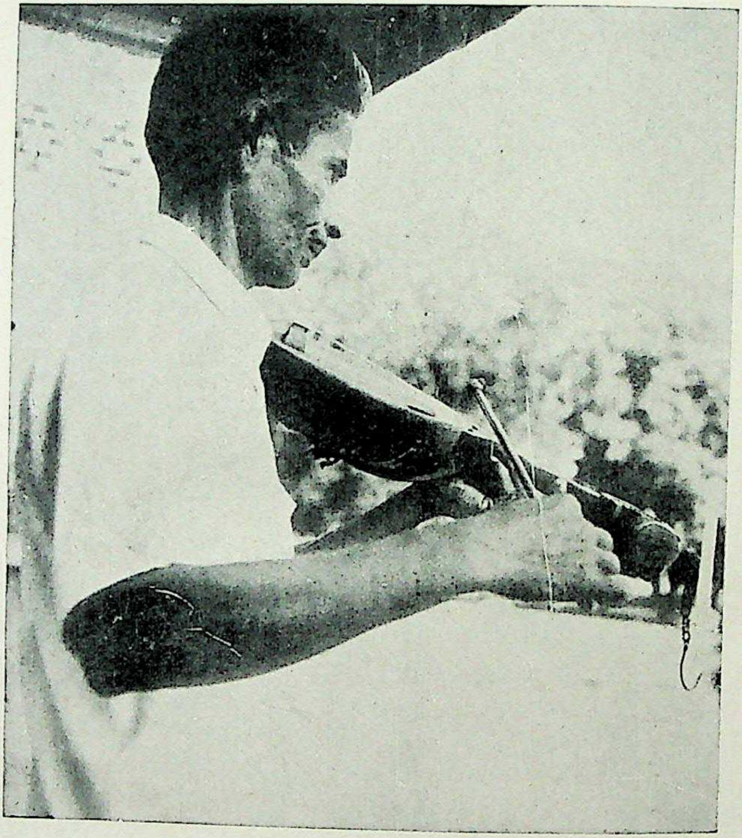

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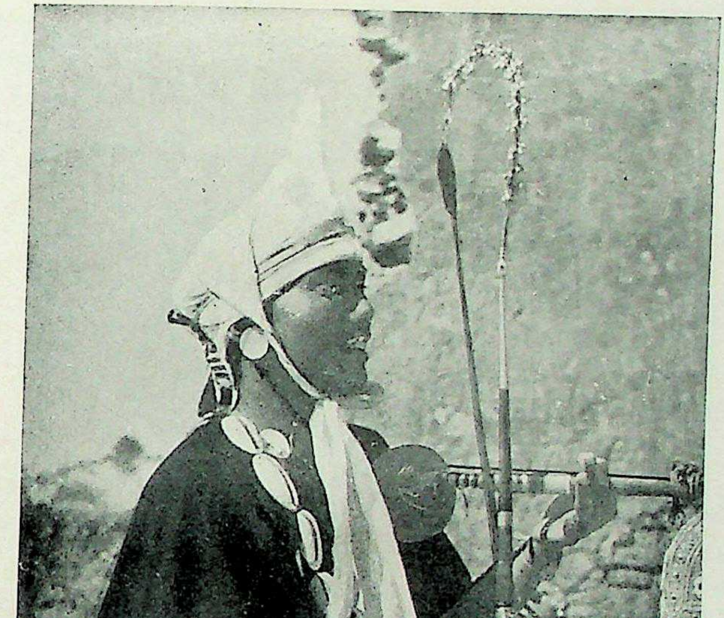

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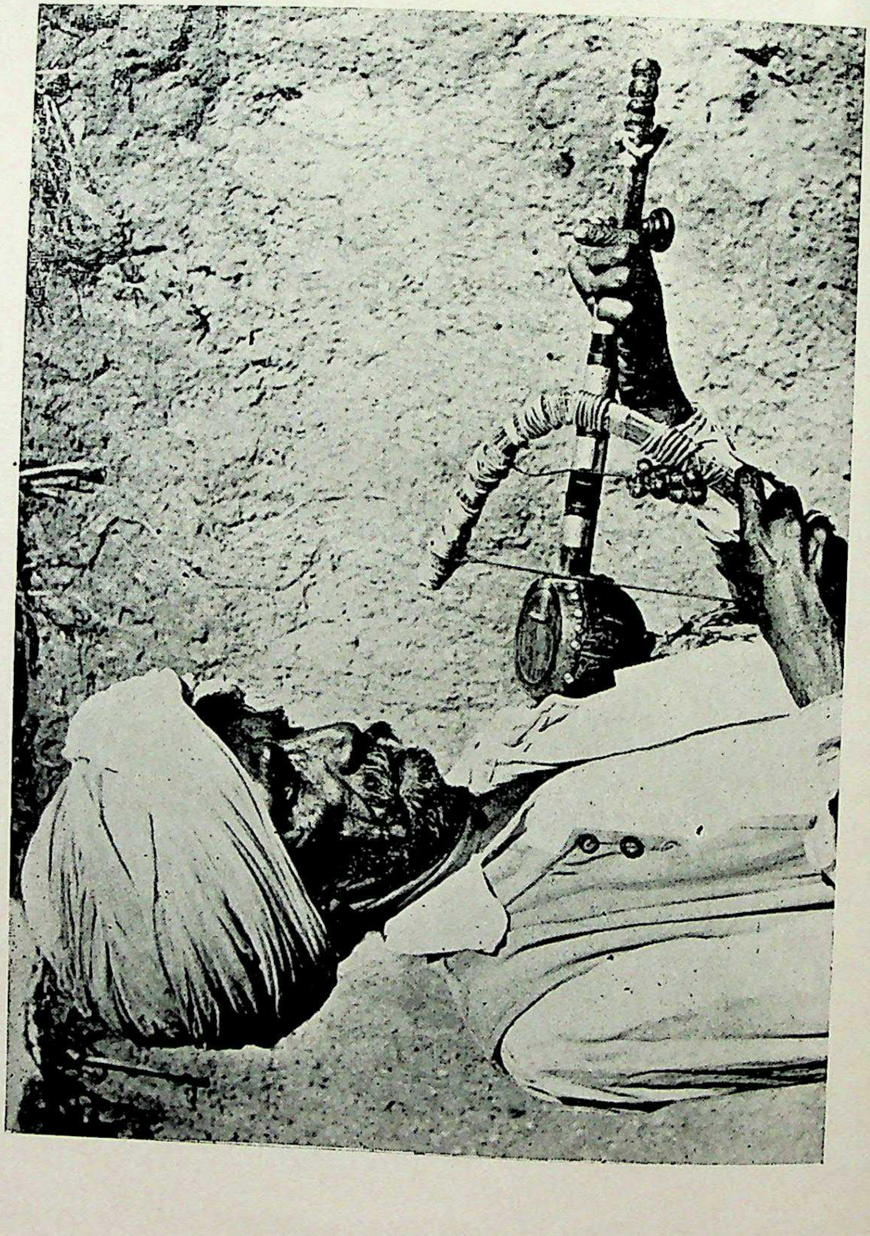

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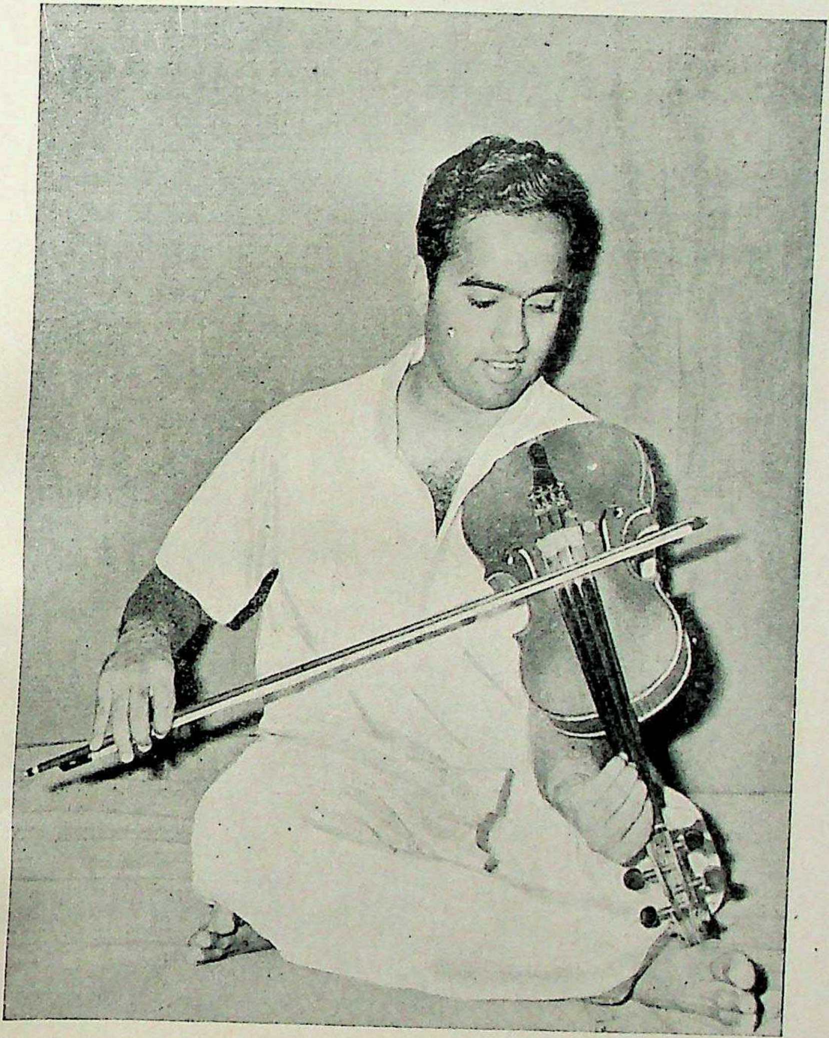

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